

**STUDY OF ADHESIVE INTESTINAL OBSTRUCTION AND ITS
MANAGEMENT IN COIMBATORE MEDICAL COLLEGE HOSPITAL**



**Dissertation submitted in
Partial fulfilment of the regulations required for the award of
M.S. DEGREE**

**In
GENERAL SURGERY – BRANCH - I**



**THE TAMILNADU
DR. M.G.R. MEDICAL UNIVERSITY
CHENNAI
APRIL- 2013.**

CERTIFICATE

This is to certify that the dissertation entitled “**STUDY OF ADHESIVE INTESTINAL OBSTRUCTION AND ITS MANAGEMENT IN COIMBATORE MEDICAL COLLEGE HOSPITAL**” is a bonafide work done by **Dr.P.Murugadasan**, Post Graduate student in Department of General Surgery, Coimbatore Medical College, under the supervision and guidance of **Dr.P.Swaminathan, M.S., D.O.**, Professor of Principles and Practice of Surgery, Department of General Surgery, Coimbatore Medical College, Coimbatore, in partial fulfilment of the requirement of **The Tamilnadu Dr.M.G.R.Medical University** for the award of M.S. Degree in General Surgery.

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DECLARATION

I, **Dr.P.Murugadasan** solemnly declare that dissertation titled, “**STUDY OF ADHESIVE INTESTINAL OBSTRUCTION AND ITS MANAGEMENT IN COIMBATORE MEDICAL COLLEGE HOSPITAL**” is a bonafide work done by me at Coimbatore Medical College Hospital, during September 2011- November 2012 under the guidance and supervision of **Prof. Dr.P. Swaminathan M.S.,D.O.**, Professor of Principles and Practice of Surgery, Department of General Surgery, Coimbatore Medical College, Coimbatore.

The dissertation is submitted to **The Tamilnadu Dr.M.G.R.Medical University**, towards partial fulfilment of requirement for the award of **M.S.Degree in General Surgery (BRANCH – I)**.

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DATE:

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ABSTRACT

INTRODUCTION

Intestinal obstruction accounts for 20% of all surgical emergencies around the world. Adhesions becoming the leading cause of intestinal obstruction. Adhesions accounts for 1% of all surgical admissions and 3% of all laparotomies. Though the mechanism of adhesion formation is well known, there is no successful pharmacological means of adhesion prevention.

STUDY PERIOD

September 2011 to November 2012. Study type is observational study.

AIMS OF THE STUDY

To study the clinical presentation, causes and the treatment modalities available in our hospital.

METHODOLOGY AND RESULTS

Out of 45 cases studied, males are most commonly affected than females with the male to female ratio of 1.5:1. Post surgical adhesive intestinal obstructions are most common than post inflammatory adhesive intestinal obstruction. Most of the patients had undergone emergency surgery than elective surgery. Out of 45 cases 74.8% of the patients had viable bowel and 24.2% of the patients had gangrenous bowel at the time of surgery. Omentum was found to be the most common organ involved and caesarean section was the most common cause in adhesive intestinal obstruction. Two were died in the post operative period due to the presence of co-morbid medical problems.

CONCLUTION

Intestinal obstruction is a real emergency and adhesions becoming the leading cause of intestinal obstruction. Post surgical adhesive intestinal obstructios are most common than post inflammatory adhesive intestinal obstruction. Wound infection is the most common complication. Mortality depends upon the co-morbid medical illness.

KEY WORDS

Intestinal obstruction, adhesions, post inflammatory adhesions.

INTRODUCTION

Intestinal obstruction accounts for 20 % of all surgical emergencies around the world. Intestinal obstruction can result from a variety of causes. Among them adhesions has become the leading cause of intestinal obstruction. Though the diagnosis being straight forward, management of adhesive intestinal obstruction possess a lot of problems due to the high incidence of recurrence.

The advent of laparoscopic surgery has altered the incidence of adhesions to some extent. The incidence of post operative adhesive intestinal obstruction has been increasing over the past few decades. Inflammatory adhesions and post surgical adhesions are the two types of acquired adhesive intestinal obstruction. Majority of the cases are post surgical adhesions.

Adhesions account for 1% of all surgical admissions and 3% of all laparotomies. Handling of the viscera in the infracolic compartment is more likely to produce adhesive intestinal obstruction. The incidence of adhesive intestinal obstruction is more with major abdominal surgeries than minor abdominal surgeries and still more with multiple abdominal surgeries. When the patient presented with the feature of intestinal obstruction and with the history of previous abdominal surgery, the most likely cause is postoperative adhesions. Omentum plays a protective role in the formation of adhesions. Omentectomy leaves adhesiogenic areas to the small bowel and this leads to higher incidence of small bowel adhesions after total colectomy which involves omentectomy.

Simple adhesiolysis is usually employed in those patients who require surgery for adhesive obstruction. Half of the surgeons prefer total adhesiolysis where as half of them prefer adhesiolysis limited to adhesions causing obstructions. Though the mechanism of adhesion formation is well known, yet there is no successful pharmacological means of preventing the adhesion formation. In spite of recent advances still adhesive intestinal obstruction holds a major share of mortality due to many practical factors. Intestinal obstructions below the age of twelve years are usually caused by congenital causes like bands. Post surgical and post inflammatory adhesions are common in adults.

This study proposes to analyze the clinical course of the disease and treatment modalities available for adhesive intestinal obstruction in our hospital.

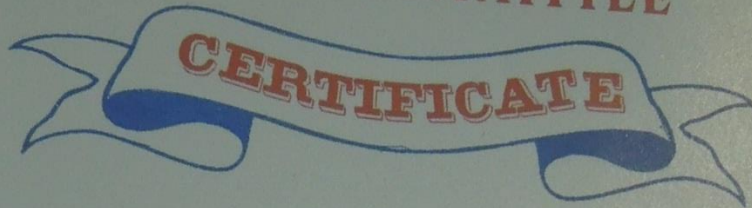


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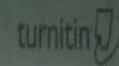
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OBJECTIVES OF THE STUDY

- 1) To study the clinical presentation of adhesive intestinal obstruction.
- 2) To find out the causes of adhesive intestinal obstruction.
- 3) To find out the most common site for adhesion.
- 4) To study the treatment modalities available for adhesive intestinal obstruction in our hospital.

HISTORICAL HIGHLIGHTS AND PIONEERS IN TREATMENT

HIPPOCRATES AND CELSUS (460 BC):

Hippocrates, the father of medicine, and Celsus followed the pattern of Egyptian treatment which was the administration of purgatives and enema for three consecutive days once in a month to clear the bowel.

AMBROSE PARE (1510-1590)

Ambroise Pare a French physician identified the bowel obstruction first time and he reported a patient who died of twisted bowel.

LITTRE (1713)

Littre suggested the proximal decompression of the bowel by incision

PILLARE (1776)

He first made a successful caecostomy for a patient with carcinoma rectum

DUCT (1793)

He performed the first successful sigmoidostomy.

DIFFEN BACK (1836)

He resected the small bowel and anastomosed. He did a major role in suturing the bowels.

LAMCRANCES (1800)

He sutured the traumatic wounds of the colon

PAUL AND BLACK (1846 AND 1892)

He advocated the procedure of exteriorization of the colon.

MURPHY (1892)

First introduced the button method of anastomosis

PARKER AND KEEP (1908)

They introduced the principles of aseptic anastomosis.

WESTERMAN (1910)

He introduced the siphonage drainage of the stomach.

WANGENSTEIN (1913)

He described the duodenal tubes.

CANTOR (1946)

He introduced the ryle's tube as gastric suction tube. Large food particles could not be aspirated through ryle's tube but can't be done with stomach tube.

HUMER HULTL (1908)

He developed the surgical stapling method which was later modified by Von Petz and Frederich in 1934.

NOBLE

He plicated the adjacent coils of small intestine to prevent further recurrent adhesions.

CHILD PHILLIPS

He plicated the mesentery to prevent further adhesions.

WITZEL

Using witzel's jejunostomy a stiff tube is passed through the jejunostomy opening in the proximal bowel upto the entry into the large bowel, which acts as intraluminal splinting.

ASSALIA et al

Gastrograffin was first used by Assalia et al in the 1980s.

FRIEDRICH TRENDELENBERG (1844-1924)

First tangential occlusion clamp was developed by him.

AMYAND (1736)

He did the first appendicectomy.

SURGICAL ANATOMY AND APPLIED PHYSIOLOGY

The alimentary canal is divided into three into three parts namely foregut, midgut and hindgut⁶.

Gut	Parts	Arterial Supply	Functions
Foregut	Stomach, duodenum upto the major duodenal papilla.	Coeliac axis	Digestion
Midgut	Major duodenal papilla to the junction of middle and distal third of transverse colon.	Superior mesenteric artery.	Absorption
Hindgut	Distal third of transverse colon, descending colon, rectum and anal canal.	Inferior mesenteric artery	

INTESTINES

Intestines are divided into small bowel and large bowel⁶. The small intestine extends from the pylorus to the ileocaecal junction. The small bowel consists of duodenum, jejunum and ileum. The large bowel extends from the caecum to the anal canal⁴. The large bowel comprises of caecum, appendix, ascending colon, transverse colon, descending colon, sigmoid colon, rectum and anal canal.

DUODENUM

The duodenum is the first and shortest part of the small intestine¹. It has a length of 25 cm. Duodenum is the widest and most fixed part of the small

intestine. It has a C-shaped course around the head of pancreas⁶. Duodenum starts at the pylorus and ends at the duodenojejunal flexure at the level of L2 vertebra. The first 2 cm of the small bowel has got mesentery and is mobile. This part is called ampulla or duodenal cap. The arterial supply of duodenum arises from celiac trunk and superior mesenteric artery³. The veins from duodenum drain into hepatic and portal veins.

JEJUNUM

Jejunum is the second part of the small intestine. It begins at the duodenojejunal flexure. Jejunum constitutes two fifths of the small intestine⁴. Most of the jejunum lies in the left upper quadrant of the abdomen in the infracolic compartment. Jejunum is deeper red in colour with a diameter of about 2-4 cm. the vasa recta is long and fat in the mesentery is less. In jejunum Peyer's patches are few in number⁵.

ILEUM

Ileum is the third part of the small intestine. Ileum ends at the ileocaecal junction. It constitutes three fifths of the small intestine^{7,8,9}. Most of the ileum lies in the right upper quadrant of the abdomen in the infracolic compartment. Ileum is paler pink in colour and 2-3 cm in diameter. Vascularity of ileum is less than jejunum and vasa recta is short. Ileum has more fat in its mesentery. Peyer's patches are more in ileum².

THE LARGE INTESTINE

The large intestine is a muscular tube which extends from the ileum to the anus. The length of the large intestine is about 135 cm. it has a circular muscle layer and a longitudinal muscle layer. The circular muscle layer is continuous but the longitudinal muscle layer is arranged in three bands called taenia coli (taenia mesocolica, taenia omentalis, taenia libera). In the rectum these three taenia coli fuse to form a continuous layer.

Caecum is a blind sac which is the starting portion of large intestine. It is 6 cm long and 7.5 cm broad. Ascending colon is 15 cm long and fixed posteriorly in the hepatic flexure. Transverse colon is approximately 40-45 cm long and it is fixed by phrenocolic ligament in splenic flexure¹⁰.

Descending colon is about 20 cm long and fixed posteriorly. Sigmoid colon extends from the descending colon at the pelvic brim to the commencement of the rectum at the level of S3 vertebra and has a length of about 20-60 cm.

The taenia coli of sigmoid colon are wider than in other parts of the colon and have appendices epiploicae^{1,9}.

The rectum is 12-15 cm in length and has no taenia coli, no appendices epiploicae, no sacculations and no haustrations. The anal canal is the terminal

portion of the large intestine it is 3-8 cm in length and develops partly from endoderm and partly from ectoderm.

BLOOD SUPPLY

The intestines are supplied by superior mesenteric and inferior mesenteric arteries and their branches. Duodenum is supplied by the celiac axis¹⁰. Venous drainage of the intestines empties into the portal vein which is formed by the union of superior mesenteric vein and splenic vein. The inferior mesenteric vein joins to the splenic vein.

SUPERIOR MESENTERIC ARTERY

It arises from the aorta at the level of L 1 vertebra and gives three branches namely, the ileocolic artery, right colic artery and the middle colic artery⁶. The left branch of the middle colic artery takes part in the arch of Riordan, a collateral channel anastomosing with the inferior mesenteric artery.

INFERIOR MESENTERIC ARTERY

It arises from the aorta at the level of L3 vertebra. It supplies the colon from the splenic flexure to the rectum. It gives off left colic artery, sigmoid arteries (3-4) in number and superior rectal artery⁶.

MARGINAL ARTERY OF DRUMMOND

It is a paracolic vessel found by the anastomosis between colic arteries. Vasa recta arises from the marginal artery of Drummond⁹. This artery is less consistent at the splenic flexure called Griffith's point and less consistent at the lower sigmoid called the Sudeck's point.

MESENTERY

The mesentery is a fan-shaped peritoneal fold that attaches the jejunum and ileum to the posterior abdominal wall¹¹. The root of the mesentery is about 15 cm long. It is directed obliquely, inferiorly and to the right. It extends from the left side of L2 vertebra and fans out towards the right sacroiliac joint. The average length of the mesentery is 20 cm. The mesentery has two layers. In between them there are superior mesenteric vessels, lymph nodes, fat and autonomic nerves.

LYMPHATIC DRAINAGE

A. Parietal: lies in relation to the large blood vessels like

1. External iliac
2. Common iliac
3. Hypogastric
4. Internal iliac
5. Lumbar and para aortic

B. Visceral: lies along the superior and inferior mesenteric vessels¹¹.

NERVE SUPPLY

Parasympathetic nerves are derived from the celiac plexus and sympathetic nerves are derived from the pelvic plexus. The parasympathetic fibres are preganglionic⁵. They are motor in function to the gut and secretomotor to the glands. The sympathetic fibres express inhibitory action to the gut muscle and motor to the muscle sphincter. The parasympathetic motor fibres lie along the myenteric plexus and the secretomotor fibres along the Meissner's plexus.

APPLIED PHYSIOLOGY

The main function of intestines are digestion, absorption, excretion and peristaltic movement⁵.

DIGESTION

Gastric juice, pancreatic juice and intestinal hormones are responsible for the digestion of food⁵.

ABSORPTION

Sugar and amino acids are absorbed from the proximal and mid intestine. Iron, calcium, water soluble vitamins are absorbed by jejunum. Water and electrolytes are absorbed by colon. Drugs may be absorbed from the rectum in the form of retention enema

PERISTALTIC MOVEMENTS

1. Rhythmic contractions or segmentations
2. True peristaltic movements

These are the two types of peristaltic movements of the intestine^{3,4}. Rhythmic contraction or segmentation is myogenic in origin and this movement helps in thorough mixing of the food. This movement is best developed in the ileum, less in the jejunum and rare in the duodenum. The true peristaltic movements occur in the whole length of the intestine. The amplitude and propagatory distance vary with the phase of digestion over the loop proximal to the obstruction. The amplitude and propagatory distance depends upon the loaded condition of the bowel². The rate of peristaltic waves remains constant and not depend on the digestive phase and loaded condition of the colon.

In acute obstruction abdominal pain occurs as a first evidence which is due to the vigorous contraction of the bowel musculature¹⁹. The abdominal distention is not so marked in higher level obstruction.

In the low level obstruction, fluid accumulates in the lumen very slowly and hence the vomiting is delayed⁹. If the stomach and small bowel become loaded with fluid, there will be considerable abdominal distention. The abdominal distention is due to the accumulation of fluid and gases proximal to the obstruction. The losses are water, sodium and potassium. RBC and plasma

may be lost from the strangulated bowel segment. General factors contribute to the overall loss which is mainly from the extracellular compartment. The area of absorptive mucosa is unavailable for the process of absorption distal to the obstruction.

PATHOPHYSIOLOGY

Intestinal obstruction is classified into two types⁴.

- I. Dynamic obstruction- peristalsis is working against a mechanical obstruction¹.
- II. Adynamic obstruction- peristalsis is absent or present in a non propulsive form

CAUSES OF INTESTINAL OBSTRUCTION:

- I. Dynamic –
 - A) Intraluminal –
 - 1. Impaction
 - 2. Foreign bodies
 - 3. Gall stones
 - 4. Bezoars
 - B) Intramural –
 - 1. Stricture
 - 2. Malignancy
 - C) Extraluminal –
 - 1. Adhesions
 - 2. Bands
 - 3. Obstructed hernias
 - 4. Volvulus
 - 5. Intussusceptions

- II. Adynamic – i) Paralytic Ileus

III. Mesenteric vascular occlusion

IV. Pseudo obstruction

1. Adhesions – 40%
2. Inflammatory – 15%
3. Carcinoma – 15 %
4. Obstructed hernias – 12 %
5. Faecal impaction – 8 %
6. Pseudo obstruction – 5 %
7. Miscellaneous – 5%

In dynamic obstruction the proximal bowel dilates and develops an altered intestinal mobility. To overcome the obstruction the peristalsis is increased in the proximal bowel. If the obstruction is not relieved the proximal bowel begins to dilate which results in reduction of peristaltic strength that leads to flaccidity and bowel paralysis. The proximal bowel distension is produced by gas and fluids.

Gas:

Overgrowth of aerobic and anaerobic organisms resulting in gas production. Following the reabsorption of oxygen and carbon dioxide, the remaining is made up of nitrogen and hydrogen sulphide¹.

Fluid:

Made up of various digestive juices like gastric juice, intestinal hormones and pancreatic juices.

Adhesions accounts for 40% of all intestinal obstructions. Any source of peritoneal irritation will increase the local fibrin production that leads to adhesion between opposed surfaces¹.

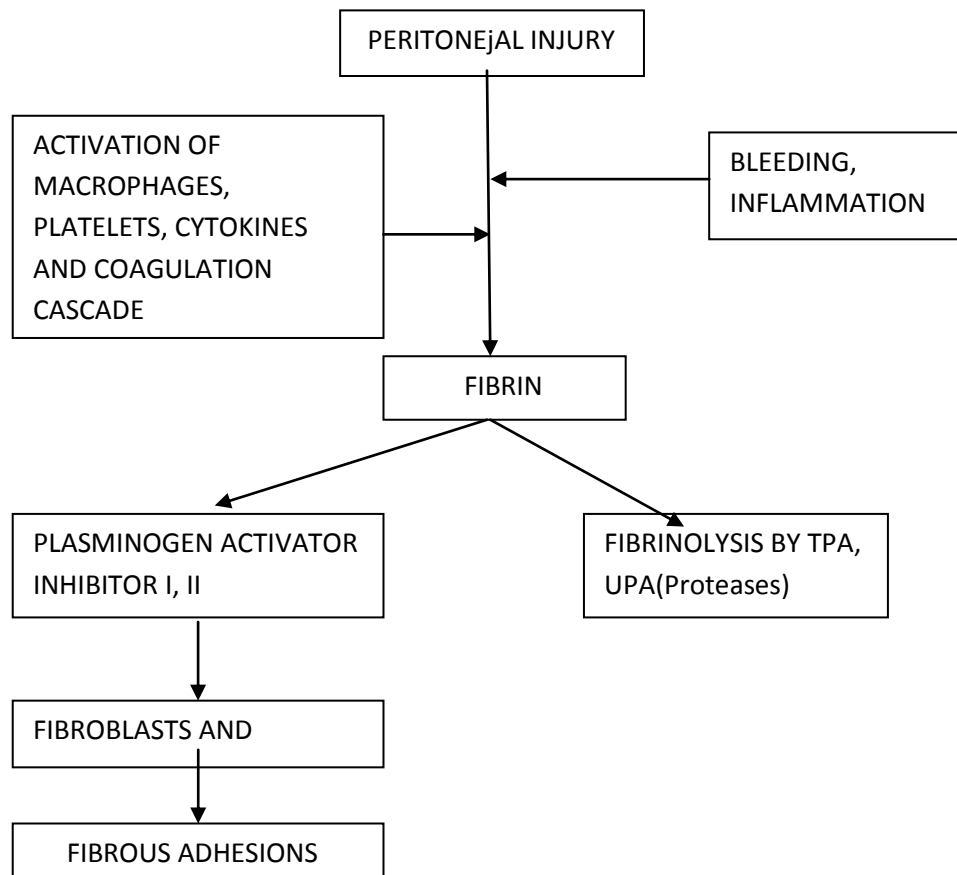
Types of Adhesions:

- A) According to time of onset¹⁶ – 1. Early – Fibrinous Adhesions (flimsy)
2. Late – Fibrous Adhesions (dense)
- B) According to etiology – 1. Post surgical Adhesions
2. Post inflammatory Adhesions
- C) According to development – 1. Congenital Adhesions (bands)
2. Acquired.

When peritoneum is damaged during surgery, the protective mesothelial cell layer lining the peritoneum is disturbed^{13,16}. This leads to an inflammatory response consisting of hyperemia, fluid exudation, activation of cytokines, macrophages and the onset of coagulation cascades. This leads to fibrin deposition in the damaged serosal surfaces²¹. This flimsy adhesions are degraded by proteases of the fibrinolytic system and restore the normal peritoneal surface²¹. In the presence of plasminogen activator inhibitors I and II,

the fibrinolytic activity becomes insufficient that leads to permanent fibrous adhesions⁴. Collagen is deposited within one week.

Mechanism of Adhesion Formation



Fibrinolytic activity in peritoneal fluid is decreased after surgery because of the following two reasons¹².

1. Initial decrease in tissue type and urokinase type plasminogen activator²⁴.
2. Increase in plasminogen activator inhibitor type I, II induced by cytokines like IL-1, IL-6, TNF-alpha²⁴.

Type I – Fibrinous adhesions.occurs during 5-10th day of surgery.it is avascular and flimsy.

PERITONEAL REPAIR AND POST SURGICAL ADHESION

FORMATION:

Peritoneal healing differs from the skin healing mechanism. When a defect is made in the peritoneum the entire surface becomes epithelialized simultaneously and not from the borders of the wound as in epidermalization of skin wounds. Multiplication and migration of mesothelial cells from the borders of the peritoneal wound play small part in the regenerative process. Surgically traumatized tissues in apposition binds through fibrin bridges which become organized by wound repair cells and neovascularization leading to adhesion formation.

Healing occurs in 5 to 6 days after peritoneal injury. A single layer of mesothelial cells resting on a continuous basement membrane is seen at tenth day after surgery. Healing of parietal peritoneum is different from visceral peritoneum in that, the parietal peritoneum contains basement membrane and the mesothelium of visceral peritoneum does not contain basement membrane.

Peritoneal injury due to cauterization by electrical current leads to delayed peritoneal healing because of extensive tissue damage. Even after 3 weeks of surgery the cauterized peritoneal site contains tissue necrosis, polymorpho nuclear leucocytes, minimal fibroblasts and collagen. So peritoneal healing is delayed in the site of peritoneal cauterization.

Fibrinolytic activity of peritoneum is present in all mesothelial surface and is dependent primarily on the balance of the tissue plasminogen activator

and tissue plasminogen activator inhibitor. The tissue plasminogen activity is decreased 4 to 6 hours after surgery and disappears after 24 to 48 hours. The level of plasminogen activator inhibitor I,II are increased after surgical trauma to peritoneum. This imbalance between the tissue plasminogen activator and plasminogen activator inhibitor leads to adhesion formation.

Strategies for adhesion prevention

1. Minimize the surgical trauma
2. Minimal tissue handling
3. Avoiding dessication and ischaemia
4. Washing of peritoneal cavity with saline to remove cloth
5. Minimizing contact with gauze¹.
6. Careful placing of drains
7. Laparoscopic procedures has got lesser chance of adhesions¹⁸.

PREVENTION OF ADHESION FORMATION

Many substances have been instilled into the peritoneal cavity to prevent adhesion formation. They are as follows:

1. Instillation of hyaluronidase into the peritoneal cavity
2. Hydrocortisone
3. Silicone
4. Dextran

5. Polyvinyl propylene
6. Streptomycin
7. Chondroitin
8. Anti coagulants
9. Anti histamins
10. Streptokinas
11. Ringer lactate
12. HMG-CO A reductase inhibitors²².
13. Pentoxifylline- methyl xanthine derivatives

These substances increases the fibrinolytic activity in the damaged peritoneum and thereby preventing adhesion formation¹². Dextran is used in infertility surgeries to prevent adhesions. Povidone iodine has anti adhesive effects but it is used for its antimicrobial action rather than its antiadhesive effect.

CAUSES OF ADHESION FORMATION

1. Infections due to appendicitis, pancreatitis, TB, peritonitis¹.
2. Acute infective abdominal conditions.
3. Surgical materials like silk, mop, talc powder.
4. Bowel ischaemia.
5. Sepsis.
6. Inflammatory bowel disease.

7. Tuberculosis.
8. Malignancy,peritoneal injury.

ABDOMINAL TUBERCULOSIS

Abdominal tuberculosis is one of the important cause of post inflammatory adhesive intestinal obstruction. Tuberculosis is common in India & developing countries. tuberculous abdomen is the sixth most common type of extrapulmonary tuberculosis. The incidence and the severity of abdominal tuberculosis increases with increasing incidence of HIV infection.

TYPES OF ABDOMINAL TUBERCULOSIS

1. Intestinal.
2. Peritoneal Tuberculosis.
3. Tuberculosis of Mesentery and mesenteric nodes.
4. Ano-recto-sigmoid tuberculosis.
5. Miliary Tuberculosis.
6. Tuberculosis of the Omentum.
7. Retroperitoneal Tuberculosis.

Ileocecal region is most commonly affected in intestinal tuberculosis due to presence of Peyer's Patches and stasis of luminal contents aided by ileocecal valve.Ulcerative, Hyperplastic, ulcerohyperplastic are the three types of intestinal tuberculosis. Peritoneal tuberculosis may present as acute or chronic

illness. Chronic peritoneal tuberculosis may be associated with pericardial or pleural effusion. Intestinal tuberculosis is called as Koenig's syndrome.

Causative organisms of Abdominal Tuberculosis

1. Mycobacterium tuberculosis-acid fast and alcohol fast organism
2. Mycobacterium bovis-atypical mycobacterium

Mode of spread of abdominal tuberculosis

Ingestion of food materials contaminated with TB bacilli may cause intestinal tuberculosis. Ingestion of tuberculous bacteria infective sputum from primary focus may cause secondary tuberculosis. Abdominal TB can occur due to haematogenous spread from lung tuberculosis or from neck lymph nodes through lymphatic spread. Fallopian tube tuberculosis may retrogradely spread to involve the peritoneum.

Presenting symptoms of abdominal tuberculosis

1. Abdominal pain.
2. Fever.
3. Night sweats.
4. Weight Loss.
5. Vomiting.
6. Constipation.
7. Diarrhea.

Computed Tomographic features of Abdominal tuberculosis

1. Peritoneal Involvement.

2. Ascites.
3. Mesenteric Fat Stranding.
4. Omental thickness.
5. Lymphadenopathy.
6. GI strictures.
7. Bowel wall thickening.

ILEOCECAL TUBERCULOSIS:

Ileocecal tuberculosis is the most common site of abdominal tuberculosis due to the presence of Peyer's patches. The ileocecal valve favours the stasis of luminal contents and thus help in the development of ileocecal TB. Stricture is most common in ileocecal region. Diffuse tuberculosis colitis is less commonly seen and mimics ulcerative colitis in colonoscopy.

Ulcerative, Hyperplastic and ulcerohyperplastic are the three types of ileocecal TB. Ulcerative type of ileocecal TB occurs usually in old people secondary to pulmonary TB. Diarrhea, Bleeding per rectum, loss of weight and loss of appetite are the clinical features. Barium study may show ileal stricture with hypermotility. Hyperplastic type is less common than ulcerative type of ileocecal TB. It occurs as primary intestinal tuberculosis. Ulcerative type is usually caused by *Mycobacterium bovis* bacilli.

Hyperplastic ileocecal tuberculosis may present as a mass in the RIF and subacute intestinal obstruction. There is no primary lesion in the chest

Xray. Barium study shows pulled up cecum and obtuse ileocecal angle. The most common complication of small bowel TB is obstruction due to narrowing of the lumen by hyperplastic caecal tuberculosis.

Clinical Features of Ileocecal Tuberculosis:

1. Abdominal pain.
2. Anemia.
3. Loss of weight.
4. Loss of appetite.
5. Mass in RIF.
6. Fever.
7. Diarrhea.
8. Features of intestinal obstruction.

Ileocecal region is the common site of abdominal TB due to

1. Stasis.
2. Abundant Peyer's patches.
3. More bacterial contact time with mucosa.
4. Liquid content of the stools.
5. Minimal digestive activity.

Tuberculous Mesenteric Lymphadenitis:

Mesenteric Tuberculous adenitis is most common in children and present with anemia, fever, loss of weight, loss of appetite and mass in the right iliac fossa. Massive mesenteric lymph nodes enlargement due to tuberculosis is called

Tabes mesenterica. Right sided mesenteric nodes are more commonly involved than left sided ones. Infection is usually through Peyer's patches. Caseating materials may be collected between the layers of mesentery to form cold abscess. Usually the pain is felt in the umbilical region and the mass is felt in the right iliac fossa.

TUBERCULOSIS OF THE OMENTUM

Rolled up omentum with thickening is characteristic of omental tuberculosis. Cold abscess can develop in the omentum and can be dealt with laparoscopy under cover of anti tubercular drugs.

PERITONEAL TUBERCULOSIS.

In peritoneal tuberculosis the parietal peritoneum is thickened with multiple yellowish tubercles.

There is dense adhesions in the peritoneum and omentum which may leads to intestinal adhesions. Multiple adhesions between bowel loops or between bowel loops and peritoneum can develop. Peritoneal tuberculosis can be divided in to acute or chronic types. Acute peritoneal tuberculosis mimics acute abdomen. Chronic peritoneal tuberculosis can be further divided in to dry type with adhesion, wet type with ascites and fibrous type with omental thickening and loculated ascites. In ascitic type of abdominal tuberculosis, the ascetic fluid is pale yellow, clear, rich in lymphocytes and the specific gravity is

high. Because of the fibrin deposition ascites may get loculated leading to loculated ascites.

Plastic peritoneal tuberculosis

There are widespread adhesions between the coils of intestines, abdominal wall and the omentum with bowel distention leading to blind loop, ileus and intestinal obstruction. It may presents as colicky abdominalpain, diarrhea, wasting, loss of weight, doughy abdomen and mass in the abdomen.

It responds well to antitubercular treatment and surgery is needed only when there is intestinal obstruction and adhesions.

Paustian (1964) criteria for the diagnosis of abdominal tuberculosis

1. Histological evidence of tubercles with caseation necrosis
2. Typical operative findings with biopsy showing histological evidence of tuberculosis.
3. Culture of suspected tissue resulting in growth of tuberculous bacilli.
4. Demonstration of acid fast bacilli in the lesion.

Purulent form of peritoneal tuberculosis occurs from tuberculous salpingitis and may present as lower abdominal mass, abdominal wall abscess or cold abscess. Prognosis is poor in purulent form of peritoneal tuberculosis. Open or laparoscopic biopsy is very useful to diagnose the peritoneal tuberculosis.

INVESTIGATIONS OF ABDOMINAL TUBERCULOSIS:

X-ray chest is very useful to find out the primary focus. Mantoux test, ESR estimation or useful in the diagnosis of abdominal tuberculosis. Plain X-ray of abdomen may shows clacified lesion in bowel, nod clacification in case of intestinal obstruction. Barium study shows the following findings in abdominal tuberculosis.

1. Pulled up ciecum.
2. Obtuse ileocaecal angle.
3. Narrow ileum with thickened ileocaecal valve.
4. Lack of barium in inflammed segment.
5. Ulcers and strictures in terminal ileum(napkin lesion).
6. Flocculation of barium.
7. Goose neck deformity of ileocaecal junction.

Colonoscopy is easiest and most direct method to diagnose the intestinal tuberculosis. Capsule endoscopy is useful to see the small intestinal tuberculous pathology.

Diagnostic laparoscopy is one of the most important investigation in the diagnosis of abdominal tuberculosis. Adhesiolysis can be done using laparoscopy. Ascites, multiple whitish tubercles, dens adhesions, bands, hyperemic edematous bowel loops can be seen.

Ascitic fluid aspiration and analysis, bio chemical assay of ascitic fluid is very useful to determine the abdominal tuberculosis. Presence of anticord factors antibody differentiate the ascetic fluid from ascites due to crohn's disease. Adenosine deaminase activity is a sensitive and specific marker for tuberculous ascites. Adenosine deaminase value more than 33 IU/L in ascetic fluid and more than 42 IU/L in serum in significant.

Adenosine deaminase is an aminohydrolase. It coverts adenosine to inosine and is thus involved in the purine bases catabolism. The enzyme activity is more in T-lymphocytes than B-lymphocytes. Adenosine deaminase is increased in tuberculous ascites due to stimulation of T-cells by mycobacterium tuberculosis. Ascitic fluid to serum adenosine deaminase ratio more than 0.985 is suggestive of tuberculosis.

ASCITIC FLUID IN ABDOMINAL TUBERCULOSIS

1. Exudates with protein level >2.5 gm/dl.
2. Serum-ascitic fluid albumin gradient < 1.1
3. Lymphocytosis.
4. Adenosine deaminase >33IU/ l.
5. Specific gravity >1.016
6. Glucose <30mg.
7. LDH >90 U/ l.

ULTRASONAGRAM FEATURES IN ABDOMINAL TUBERCULOSIS:

Ultrasonagram of abdomen is useful in the diagnosis of abdominal tuberculosis the following features can be seen in the ultrasonagram incase of abdominal tuberculosis.

1. Thickend bowel wall, mesentery, omentum.
2. Loculated ascites with fine septae.
3. Interloop ascites with alternate echogenic and echo free areas.
4. Stellate sign-bowel loop radiates from its mesenteric root.
5. Pulled up caecum presenting with a mass-pseudokidnuy sign.
6. Concentric, uniform mural thickening.
7. Matted lymphnode enlargement.
8. Mesenteric thickness more than 15mm.
9. Hepatosplenomegaly.

CT SCAN IN ABDOMINAL TUBERCULOSIS:

CT scan is very useful and reliable investigation in the diagnosis of abdominal tuberculosis it is done with plain or oral contrast medium. It is inexpensive and non invasive method and gives more information about the abdominal pathology. The following findings can be seen in CT Scan incase of abdominal tuberculosis.

1. Thickend bowel wall.

2. Thickened peritoneum.
3. Ileo-caecal valve thickening.
4. Adhesions in the bowel.
5. Enlarged and matted mesenteric nodes.
6. Features of intestinal obstruction.
7. Loculated ascites.
8. Nodules in the peritoneum.
9. Solid organs visualization.
10. Strictures in bowel wall.
11. Dilatation of bowel wall.

CT guided FNAC, biopsy or ascitic fluid aspiration can be done. Tuberculosis ascitic fluid has high attenuation value (25 to 45HU) due to its high protein content.

COMPLICATIONS OF ABDOMINAL TUBERCULOSIS:

1. Intestinal obstructions.
2. Malabsorption.
3. Blind loop syndrome.
4. Faecal fistula.
5. Adhesions.
6. Cold abscess formation.
7. Stricture formation.

TREATMENT OF ABDOMINAL TUBERCULOSIS:

Six to nine months of treatment with anti tubercular treatment is mandatory for abdominal tuberculosis. Patients present with complications should be treated for one year with anti tubercular drugs. Recurrent abdominal tuberculosis is very difficult to manage and has got high mortality. Surgery is indicated when there is intestinal obstruction, severe hemorrhage, perforation. Adhesive obstruction may be released through laparoscopic adhesiolysis. Sometimes dense adhesions may be present and is very difficult to release them even by open method. Drainage of intra abdominal abscess is important to control the disease.

TUBERCULOUS COCOON:

Abdominal cocoon is a rare cause of intestinal obstruction. It is characterized by enlargement of small bowel by a thick fibrous membrane. It is otherwise called as sclerosing encapsulated peritonitis or peritonitis chronica fibrosa incapsulata. Abdominal cocoon primarily affect young females. Tuberculous cocoon is very rare. Clinical manifestation of tuberculous cocoon abdomen are non specific and include intestinal obstruction or abdominal mass. Majority of the cases were incidentally diagnosed during laparotomy. Because of reduced awareness and atypical presentations pre operative diagnosis of tuberculous cocoon is very difficult. Barium meal study and CT scan of abdomen play an important role in the pre operative diagnosis of tuberculous

cocoon abdomen. The following findings are noted in the barium meal follow through CT.

1. Features of small bowel obstruction.
2. Reduced transit time.
3. Serpentine configuration.
4. Dilated bowel loops in a fixed 'U' shaped clusters.
5. Fibrous membrane encasing the bowel loops.

Usually the diagnosis of tuberculous cocoon is made at laparotomy where the bowel loops are encased within a sac like cocoon. The lesion is primarily involving the small bowel but can involve large intestine, liver and stomach. There may be dense inter bowel adhesions which should be lysed. The histological examination of cocoon membrane shows fibro connective tissue and caseating epithelioid granulomas.

BIOCHEMICAL CHANGES IN INTESTINAL OBSTRUCTION

The biochemical changes in intestinal obstruction are related to the site of obstruction, extent and duration of obstruction.

Vomiting and extracellular fluid sequestration into the intestine and peritoneum leads to isotonic contraction and dehydration^{3,4}.

In proximal obstruction the vomiting is more and this leads to excessive loss of water, sodium chloride, hydrogen and potassium ions producing dehydration with hypochloremia, hypokalemia and metabolic alkalosis. Distal small bowel obstruction causes loss of large quantities of fluid and less electrolytes abnormality^{1,9}.

BIOCHEMICAL CHANGES

1. Extracellular fluid Volume – ↓
2. Intracellular fluid – no change
3. Plasma sodium – no change
4. Hematocrit, plasma proteins – ↑
5. Urinary excretion of sodium – ↓
6. Urinary excretion of water – ↓

CLINICAL FEATURES OF ADHESIVE INTESTINAL OBSTRUCTION

The four cardinal features of adhesive intestinal obstruction are

1. Pain
2. Vomiting
3. Abdominal distension
4. Constipation

These features vary according to

1. The location of obstruction
2. The underlying pathology
3. The duration of obstruction
4. The presence or absence of intestinal ischaemia

Dehydration, fever, oliguria, septicaemia, hypovolumic shock are the late manifestations.

PAIN

Pain is the first symptom. It occurs suddenly and is usually severe. The pain is colicky in nature that coincides with increased peristaltic activity with increasing distention. Development of severe pain indicates bowel strangulation⁴. Pain never occurs in paralytic ileus. In case of strangulation there is always tenderness associated with rigidity. Generalised tenderness and presence of rigidity are indicative of early laparotomy.

VOMITING

Vomiting is more in the proximal obstruction and less in the distal obstruction. If the obstruction progresses the character of vomiting changes from digested food to feculent material due to bacterial overgrowth. If the obstruction is more distal, the time interval between the onset of symptoms and the appearance of nausea and vomiting will be delayed.

DISTENSION

In small bowel obstruction the degree of distension depends upon the site of obstruction. More distal the lesion greater is the distension⁹. There may be visible peristalsis.

CONSTIPATION

Constipation may be absolute or relative. Absolute constipation is a cardinal feature of complete intestinal obstruction.

DEHYDRATION

Dehydration is more in small bowel obstruction due to repeated vomiting and fluid sequestration. This may result in dry tongue, dry skin, sunken eyes and oliguria⁵.

FEVER

Fever in the presence of intestinal obstruction indicates

1. The onset of ischaemia
2. Intestinal perforation

HYPOTHERMIA

Hypothermia Indicates septicaemic shock.

ABDOMINAL TENDERNESS

Abdominal tenderness indicates bowel ischaemia or perforation.

HYPOKALEMIA

This is not a feature in simple mechanical intestinal obstruction. an increase in serum potassium, amylase and lactate dehydrogenase may be associated with bowel strangulation⁴.

INVESTIGATIONS AND DIAGNOSIS

- A. Routine investigations -
1. Complete hemogram
 2. Hemoglobin percentage
 3. Blood sugar
 4. Blood urea
 5. Serum creatinine
 6. Serum electrolytes
 7. Urine analysis
 8. Stool examination
 9. Blood grouping
- B. Special investigations –
1. X ray chest PA view
 2. ECG
 3. X Ray abdomen erect
 4. Ultrasonogram of abdomen
 5. CT scan of abdomen
 6. Diagnostic laparoscopy
 7. Gastrograffin - water soluble contrast meal

COMPLETE HAEMOGRAM:

Complete hemogram was done for all cases. Five patients showed leucocytosis about 13000 to 15000 per cubic millimeter.

HAEMOGLOBIN PERCENTAGE:

1. More than 90 % -- 9 cases
2. Hb between 80-90% -- 16 cases
3. Hb between 70-80% -- 14 cases
4. Hb between 50-70% -- 4 cases
5. Below 50% -- 2 cases

Patients with lesser than 50 % of haemoglobin had preoperative blood transfusion.

BLOOD UREA:

Blood urea was done in all the 45 cases. In 44 cases blood urea was within normal limits.

BLOOD SUGAR: Blood sugar testing is a basic investigation.

Blood sugar was tested in all the 45 cases out of which 40 patients had normal blood sugar level and five patients had blood sugar levels more than 200 mg %.

URINE ANALYSIS:

Urine analysis was done in all the 45 patients out of which five were found to have developed elevated urine sugar level. These five patients were placed on antidiabetic medications after doing blood sugar estimation.

BLOOD GROUPING:

Blood grouping was done routinely for all patients.in our study B group shows the highest incidence. AB group shows the lowest incidence.

SERUM CREATININE AND ELECTROLYTES

Routinely done for all cases. It is important for anaesthetic assessment .

X –RAY CHEST

X ray chest was taken in all the 45 patients for anaesthesiological assessment

ECG:

ECG was taken for all the 45 patients for the purpose of anaesthetic assessment.

X-RAY ABDOMEN ERECT

Plain X ray abdomen was taken for all the 45 patients. Erect posture was preferred for the following reasons.

1. The fluid levels are clearly seen in erect posture
2. Diaphragm can be better visualized and air under diaphragm can be clearly seen⁴.

X ray findings in small bowel obstruction:

1. Dilated small bowel loops characterized by straight segments that are central and lie transversely. Stepladder pattern of appearance can be seen.
2. The jejunum is characterized by its valvulae conniventes. They pass from antimesenteric border to the mesenteric border⁹.
3. The distal ileum is featureless
4. Multiple air fluid levels are seen. Number of air fluid levels are directly proportional to the degree of obstruction

X ray findings in large bowel obstruction:

The following findings are seen in x-ray. Dilated caecum shows haustral folds which are spaced irregularly and the indentations are not placed opposite to one another.

1. Dilated bowel loops are placed in the periphery
2. Multiple air fluid levels are seen but less in number when compared to small bowel obstruction
3. Low colonic obstruction does not give rise to multiple fluid levels but in high colonic obstruction there will be multiple air fluid levels.
4. Large amount of gas is seen in the caecum.

ULTRASONOGRAM:

Ultrasonogram of the abdomen was not done in all cases. Patients with acute intestinal obstruction were taken up for surgery without doing ultrasonogram. Patients with subacute intestinal obstruction were taken for surgery after doing ultrasonogram of the abdomen. Ultrasonogram of the abdomen was done in 18 patients. The following findings were noted in the ultrasonogram in acute intestinal obstruction.

1. Dilated bowel loops
2. Adynamic bowel loops
3. Any fluid collection in the abdomen

CT SCAN ABDOMEN:

CT scan confirms the presence of complete obstruction. CT scan of the abdomen was done routinely for all the cases. CT scan was done for all the patients who were taken for elective surgery. Oral contrast with CT scan is very useful for the diagnosis of intestinal obstruction. CT scan is useful to diagnose the cause of small bowel obstruction and to exclude the non adhesional pathology.

Diagnostic laparoscopy:

Diagnostic laparoscopy is very useful to detect the adhesions in case of intestinal adhesions¹⁸. Dense adhesion, site of adhesions can be better visualized with diagnostic laparoscopy.

Gastrograffin water soluble contrast study:

Gastrograffin is a hyperosmolar water soluble contrast medium. It has a diagnostic and therapeutic role in adhesive intestinal obstruction which has been evaluated recently. The use of gastrograffin water soluble medium in adhesive small bowel obstruction is very safe and reduces the need for surgery when conservative management fails²⁰..

History and Physical Examination:

Clinical history and thorough physical examination of the patient is very important to diagnose the intestinal obstruction. History of previous surgery and timing of previous surgery gives a clue to the possibility of adhesive intestinal obstruction. If the patients presented with the features of intestinal obstruction and previous abdominal scar the most likely diagnosis is adhesive intestinal obstruction¹⁵. History of constipation and per rectal examination is very important to diagnose the obstruction.

MANAGEMENT OF ADHESIVE INTESTINAL OBSTRUCTION

The management of adhesive intestinal obstruction is very difficult because surgery can induce new adhesions, whereas conservative treatment does not remove the cause of obstruction.

1. Conservative management – for sub acute obstruction
2. Surgical management – for acute obstruction.

Conservative management

Conservative management involves nasogastric tube intubation, intravenous fluid administration and clinical observation¹⁴.

Indications for Conservative Management

1. Patient's presented with sub acute pattern of obstruction.
2. Without signs of strangulation.
3. No persistant vomiting
4. CT scan findings –
 1. No free fluid in the abdomen
 2. No mesenteric oedema
 3. No devascularised bowel

Contra indication For Conservative Management:

1. Patient who had surgery within 6 weeks
2. Patients with signs of peritonitis

3. Patients with signs of strangulation
4. Persistent vomiting
5. Acute intestinal obstruction
6. Patients with irreducible hernia
7. Patients who started to have signs of resolution at the time of admission
8. Metabolic acidosis
9. Continuous abdominal pain

If the conservative management fails then the patient should be treated with surgical management¹⁷. In conservative management a nasogastric tube is introduced to decompress the stomach and intestines. Early decompression with nasogastric tube is beneficial for the patients.

When Conservative Management Should Be discontinued:

1. No resolution after 3 days, Onset of fever
2. Nasogastric drainage volume on day 3 is more than 500ml
3. Leucocytosis greater than 15000/cu.mm

Chance of Recurrence After Conservative Management:

The duration of nasogastric tube placement serves as a parameter for predicting the recurrence after the conservative management¹⁷. Patients not responding to the Ryle's tube treatment within 72 hours have higher chance of recurrent adhesive obstruction.

Surgical Management:

When the conservative treatment fails to relieve the obstruction, the patients can be treated surgically. Open method and laparoscopic method are the two surgical procedures available with their own advantages and disadvantages.

A. Surgical Options For Adhesive Intestinal Obstruction

1. Laparotomy and open adhesiolysis
2. Laparotomy and resection anastomosis with adhesiolysis
3. Laparoscopic adhesiolysis

B. Surgeries to prevent adhesive obstruction

1. Noble's plication of intestines
2. Childs Phillips mesenteric plication^{13,14}.

Indications for surgical management

1. Failure of conservative management.
2. Ileus persists for more than 3 days.
3. Persistent vomiting and abdominal pain
4. Nasogastric tube drainage volume on day 3 more than 500ml
5. Onset of fever, leucocytosis more than 15,000/cu.mm.
6. Signs of bowel strangulation
7. CT findings of intraperitoneal fluid, mesenteric oedema and lack of the small bowel faeces sign

Preoperative management

1. I.V. line with wide bore cannula should be inserted to administer intravenous fluids mostly with crystalloid solution¹.
2. Gastric decompression with ryle,s tube
3. Foley's catheter to be put todrain urine
4. All the basic blood investigations to be done
5. Maintaining the hourly abdominal girth chart, BP chart, pulse chart, temperatue, respiration is important
6. X ray chest, X ray abdomen to be taken.
7. Infective endocarditis prophylaxis to be given.
8. Clinical examinations should be repeated to assess the progression of the obstruction

Open Surgery

Laparotomy and open adhesiolysis is useful to relieve the obstruction when conservative management fails. Open surgery is preferred method for the surgical treatment of strangulating acute small bowel obstruction.

Laparoscopic Surgery

Laparoscopic adhesiolysis is better for first episode of adhesive obstruction¹⁸. In laparoscopic surgery the tissue trauma will be less and the chance of recurrence is also less²³.

Advantages of laparoscopic adhesiolysis

1. Less tissue trauma, Earlier return to full activity
2. Less chance of recurrence, post operative pain
3. Early return of intestinal functions
4. Less number of hospital stay

Noble's placcation of intestines

Adjacent coils of small bowel are sutured to prevent further recurrence.

Childe – Phillips mesenteric placcation

Plication of the intestinal mesentery will prevent crumpling of bowel and adhesion formation.

MATERIALS AND METHODS OF THE STUDY

In Coimbatore medical college hospital in the year 2011-2012, 144 cases of intestinal obstruction were admitted in both male and female wards of all the six surgical units. Out of all the 154 cases 45 cases were diagnosed to have intestinal obstruction due to adhesions. These 45 cases were included in our study for analysis. The patients in the study group were proved to have adhesive intestinal obstruction by means of surgery and relevant investigations. Patients treated conservatively are excluded from the study. A separate proforma was maintained. Whenever possible the histopathological examination of the specimen was done to confirm the clinical diagnosis. All the patients were looked for any complications during the post operative periods except the patients who died post operatively.

Inclusion criteria

1. Patients above 18 years of age
2. Patients with confirmed intestinal obstruction due to adhesion
3. Recurrent cases of adhesive intestinal obstruction

Exclusion criteria

1. Intestinal obstruction due to other causes like congenital band, mechanical bowel obstruction, growth, ileus and volvulus.
2. Patients with intestinal obstruction who were treated conservatively.
3. Pregnant women.

4. Psychiatric patients.
5. Patients below the age of 18 years.

All the patients eligible by inclusion and criterias were included in the study. All the patients eligible by exclusion criterias were excluded from the study. Datas are obtained from our study and analyzed using appropriate statistical methods. Our study type is observational study.

OBSERVATIONS IN THE STUDY

During this study period (September 2011 – November 2012), the total number of patients with adhesive intestinal obstruction who underwent surgery were forty five. 154 cases were diagnosed to have intestinal obstruction in all six surgical units out of which 45 cases were proved to have intestinal obstruction due to adhesions which constitutes 29.2% of the total intestinal obstruction. Out of this 45 cases of adhesive intestinal obstruction 27 patients were male and remaining 18 patients were female.

Table –1

Total number of cases (n = 45)

S. NO.	AGE IN YEARS	MALE	FEMALE	% OF MALE	% OF FEMALE	TOTAL
1	18 – 20	3	0	6.70%	0 %	6.70%
2	21 – 30	5	2	11.00%	4.44%	15.44%
3	31-40	1	2	2.22%	4.44%	6.70%
4	41-50	9	4	19.90%	8.90%	28.70%
5	51-60	3	4	6.70%	8.90%	15.44%
6	61-70	2	5	4.40%	11.00%	15.44%
7	71-80	4	1	8.70%	2.20%	11.00%
			18	60%	40%	100%

M:F = 27:18 (1.5: 1)

Among the 45 cases of adhesive intestinal obstruction 60 % were male patients and 40 % were females. This gives a male is to female ratio of 1.5 : 1 (28: 17). Table 1 shows the age and sex incidence of this study. In this study the youngest patient was a 18 year old boy with adhesive intestinal obstruction. The oldest patient was an eighty years old male with adhesive intestinal obstruction.

The maximum number of patients were in the age group of 41-50 years representing 28.70 %. Majority of female patients were in the age group of 61-70 years representing 11 % of total patients. Majority of the male patients were in the age group of 41-50 years representing 19.90% Of total patients.

Among the 45 cases, 27 cases presented as acute intestinal obstruction and 18 cases had subacute pattern of obstruction. In the acute obstruction group 16 patients were male and 11 patients were females.

Table –2

Total number of cases (n= 45)

S.NO.	PRESENTATION	MALE	FEMALE	% OF MALE	% OF FEMALE	TOTAL
1	Acute Obstruction	16	11	35.30%	24.30%	59.60%
2	Subacute obstruction	11	7	24.30%	15.40%	39.70%
		27	18	59.60%	39.70%	99.30%

Table 2 shows that most of the acute and subacute adhesive intestinal obstruction cases were male patients. Acute obstruction accounts for 59.60% and subacute obstruction accounts for 39.70 %.

In acute obstruction pattern the male female ratio was 16:11. In subacute obstruction patients, the male female ratio was 11:7.

Table –3

Total number of patients, n=45

S.NO.	TYPE OF PROCEDURE	MALE	FEMALE	% OF MALE	% OF FEMALE	TOTAL
1	Emergency	15	11	33.30%	24.30%	57.60%
2	Elective	12	7	26.40%	15.40%	41.80%
		27	18	59.70%	39.70%	99.40%

Table 3 shows number of patients who underwent elective or emergency surgeries. In this study, out of 45 cases of adhesive intestinal obstruction, 26 patients were taken up for emergency surgery and 19 patients were taken up for

elective surgery. In the emergency surgery group, 15 patients (33.30%) were males and 11 patients (24.3%) were females.

Table –4

Total number of patients (n=45)

S.NO.	PROCEDURE DONE	MALES	FEMALES	% OF MALE	%OF FEMALE	TOTAL
1	Open adhesiolysis	14	7	30.80%	15.40%	46.20%
2	Resectionanastomosis with adhesiolysis	5	6	11%	13.20%	24.20%
3	Laparoscopic adhesiolysis	7	5	15.40%	11.00%	26.40%
4	Defunctioning Transverse colostomy	1	0	2.20%	0%	2.20%
		27	18	59.40%	39.60%	99%

Table 4 shows the number of male and female patients undergone various surgical procedures. Out of 45 adhesive intestinal obstruction cases 14(30.8%) male and 7(15.4%) female patients were taken up for surgery and open adhesiolysis was done.

5 male and 6 female patients had undergone laparotomy and resection anastomosis with adhesiolysis representing 11 % and 13.2% of the total cases respectively.

7 male and 5 female patients had undergone laparoscopic adhesiolysis representing 15.4% and 11% of total number of cases. During laparotomy one male patient was found to have dense adhesions for whom a transverse colostomy was done.

In this study majority of the patients were treated by open adhesiolysis which accounts for 46.2 % of the total cases. 33 patients were treated with open surgeries and 12 patients were treated with laparoscopic surgery.

Table—5

Total number of patients (n=45)

S.NO.	CONDITION OF THE BOWEL	MALES	FEMALES	% OF MALE	% OF FEMALE	TOTAL
1	Viable	22	12	48.4%	26.4%	74.8%
2	Gangrene	5	6	11%	13.2%	24.2%
		27	18	59.4%	39.6%	99%

Table 5 shows the number and percentage of patients who had viable or gangrenous bowel at the time of surgery.

In this study majority of patients had viable bowel (74.8%) and only 11 patients had gangrenous bowel accounting for 24.2% of the total cases. most of the patients with viable gangrene had undergone elective surgery.

Table—6

Total number of patients (n=45)

S.NO.	SITE OF ADHESION	NUMBER OF CASES	PERCENTAGE
1	Bowel to bowel adhesion	5	11%
2	Bowel and omentum	25	55%
3	Undersurface of abdominal wound	21	46.2%
4	Adherent to site of surgery	4	8.8%
5	Bowel and visceral adhesion	5	11%
6	Multiple site adhesions	17	37.4%

Table 6 shows the site of bowel adhesion during surgery. Bowel was adherent to omentum in 25 cases which constitutes 55% of the total cases. 21 patients had bowel adhesion in the undersurface of the abdominal wound.

Table—7

Total number of patients (n=45)

S.NO.	ORGAN INVOLVED IN ADHESION	NUMBER OF CASES	PERCENTAGE
1	Small bowel alone involved	5	11%
2	Large bowel involved in	3	6.6%
3	Omental adhesions	25	55%
4	Visceral adhesions seen in	5	11%
5	Multiple organ involvement	7	15.4%

Table 7 shows the organs involved in the adhesions causing obstruction. Omentum was found to be the most common organ involved in adhesion. 25 patients had omental adhesions which constitutes 55% of all cases.

Table—8

Total number of patients (n=45)

S.NO.	CAUSE OF ADHESION	MALES	FEMALES	% OF MALE	%OF FEMALE	TOTAL
1	Post surgical	15	13	33.30%	28.60%	61.90%
2	Post inflammatory	12	5	26.40%	11.00%	37.40%
	TOTAL	27	18	59.70%	39.70%	99.40%

Table 8 shows the causes of adhesive intestinal obstruction in our study group of patients. 15 male and 13 female patients had intestinal obstruction due to post surgical adhesions and this constitutes 33.30% and 28.60% of all cases respectively. On the whole post surgical adhesions was found to be the most common cause of adhesive intestinal obstruction which constitutes 61.90% of all cases. Post inflammatory adhesions found in 37.40% of all cases.

Table 9

Total number of post surgical adhesive obstructions (n=28)

S.NO.	PERVIOUS SURGERY CAUSING ADHESIONS	NUMBER OF PATIENTS	PERCENTAGE
1	Appendicectomy	6	21.42%
2	Caesarean section	8	28.57%
3	Hollow viscous Perforation closure	5	17.85%
4	Hernioplasty	3	10.71%
5	Hysterectomy	3	10.71%
6	Other surgeries	3	10.71%
		28	99.97%

Table 9 show the type of previous surgery causing adhesive intestinal obstruction. Caesarean section was found to be the leading cause of post surgical adhesive obstruction, seen in 8 cases representing 28.57% of all post surgical adhesive obstruction. Appendicectomy was the most common cause of adhesive obstruction next to caesarean section, found in 6 cases representing 21.42% of the total post surgical adhesive obstructions

Table—10

Total number of post inflammatory adhesive obstruction (n=17)

S.NO.	POSTINFLAMMATORY CONDITIONS CAUSING ADHESIONS	NUMBER OF CASES	PERCENTAGE
1	Appendicitis	6	35.29%
2	Peritonitis	3	17.65%
3	Pancreatitis	3	17.65%
4	Ileo caecal tuberculosis	5	29.41%
	TOTAL	17	100%

Out of 45 cases of adhesive intestinal obstruction, Appendicitis was found to be the most common cause of post inflammatory adhesive intestinal obstruction, encountered in 6 cases which constitutes 35.29% of all post inflammatory adhesive obstruction.

Abdominal tuberculosis was the next common cause of post inflammatory adhesive obstruction, found in 5 cases representing 29.41% of all post inflammatory adhesive obstruction.

Table-11

Total number of patients (n=45)

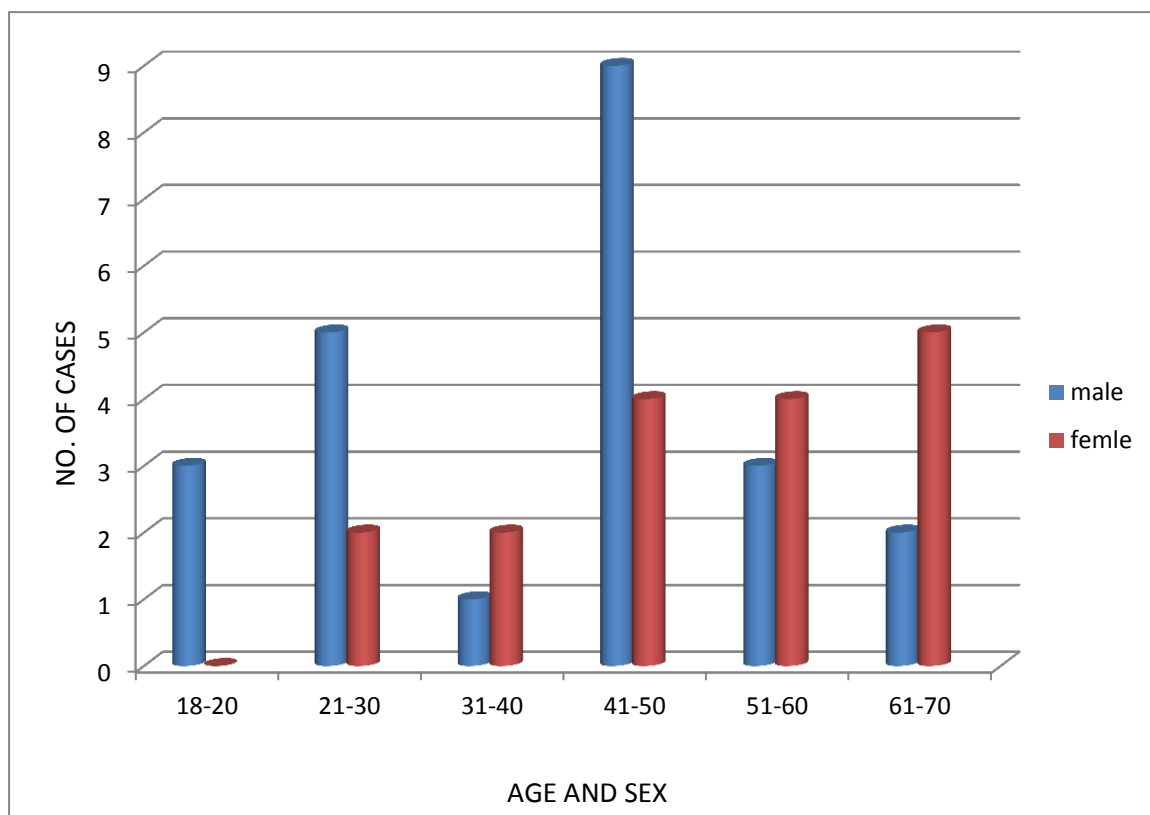
S.NO	COMPLICATONS	NO.OF MALE PATIENTS	NO.OF FEMALE PATIENTS	%OF MALE	%OF FEMALE	TOTAL
1	Wound infections	5	3	11.00%	6.60%	17.60%
2	Fecal fistula	2	0	4.40%	0%	4.40%
3	Post operative ileus	4	1	8.80%	\2.20%	11.00%
4	Burst abdomen	1	0	2.20%	0%	2.20%
5	Death	0	2	0%	4.40%	4.40%
6	Seroma	2	1	4.40%	2.20%	6.60%
	TOTAL	14	7	30.80%	15.40%	46.20%

In the study group of 45 cases, complications occurred in 21 cases which is shown in table 11. wound infection was found to be the most common complication encountered in 8 cases (17.60%) of all the cases. Two patients were died in the immediate postoperative period were above the age of 65 years and both of them were female patients due to concomitant medical illness.

Post operative ileus was found in 4 male and 1 female cases representing 8.80% and 2.20% of the total patients respectively.

DISCUSSION

Out of 154 proved cases of acute intestinal obstruction in the period of September 2011 – November 2012 in all six surgical units, 45 cases were found to be adhesive intestinal obstruction. This constitutes 29.2 % of the total intestinal obstruction in the study period from September 2011 – November 2012.

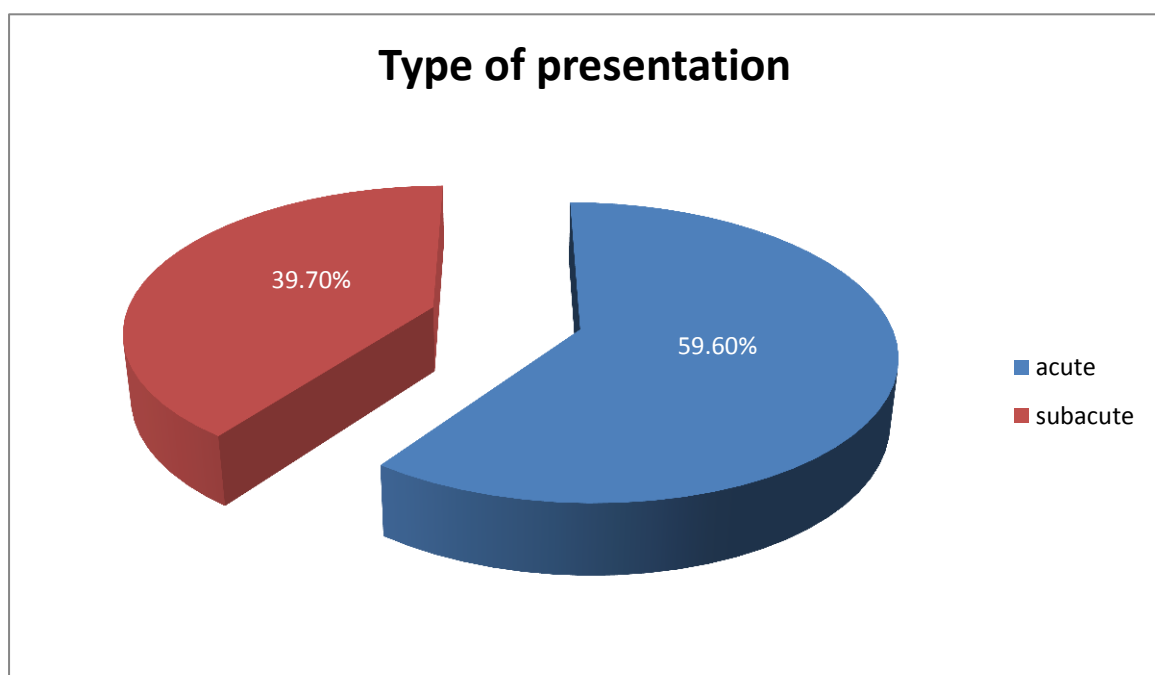


The present study showed a male: female ratio of 1.5: 1 (27:18). Males are more commonly affected than females. The Incidence of adhesive obstruction is more in the age group between 41 – 70 years. Incidence of adhesive obstruction below 20 years was 6.7 %.

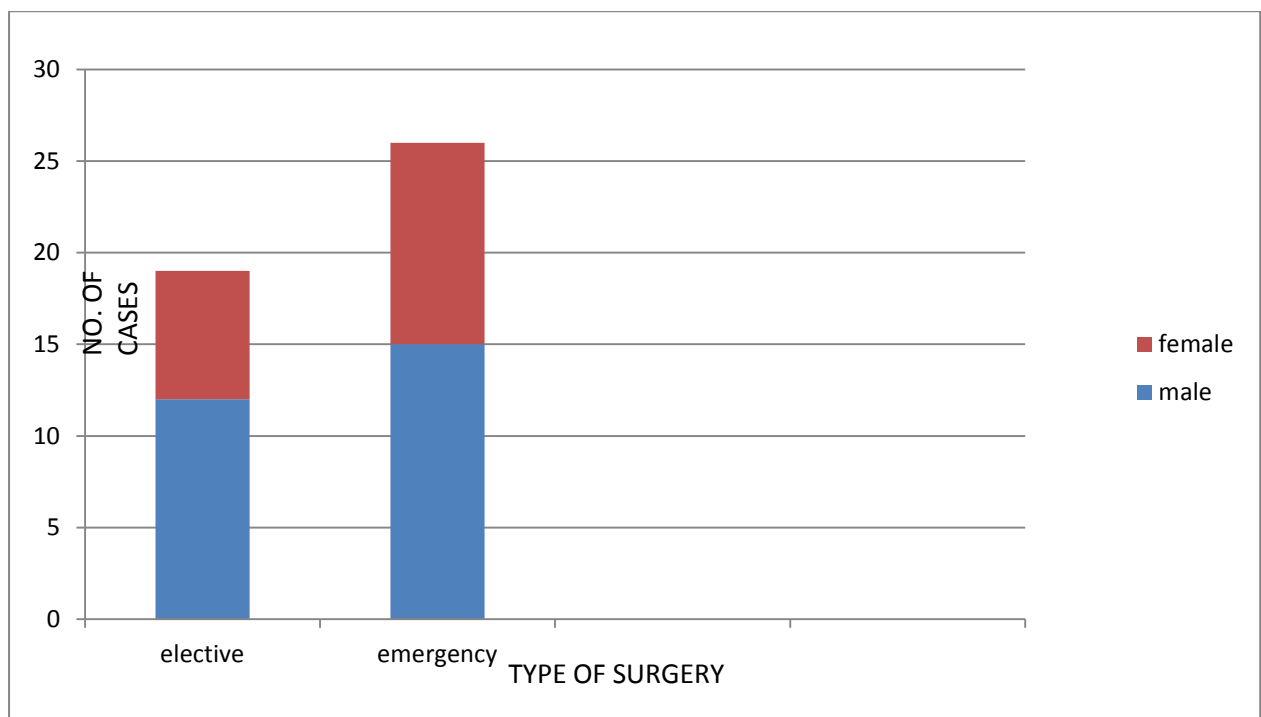
In our study the incidence of adhesive intestinal obstruction is 29.2% of the total intestinal obstruction cases. In a study conducted by Nemir, Perry, Bevan and Mentee, *ADHESION JOURNALS/birth of a star*, 2001, the incidence of adhesive intestinal obstruction was 30% of all intestinal obstruction. Our results are similar to the previous study results.

S. NO	PARAMETER	Nemir, Perry et al STUDY	PRESENT STUDY
1	INCIDENCE OF ADHESIVE OBSTRUCTION IN ALL OBSTRUCTION	30%	29.2%

In the present study 59.6% of the patients presented as acute intestinal obstruction whereas 39.7% of the patients presented as subacute obstruction.

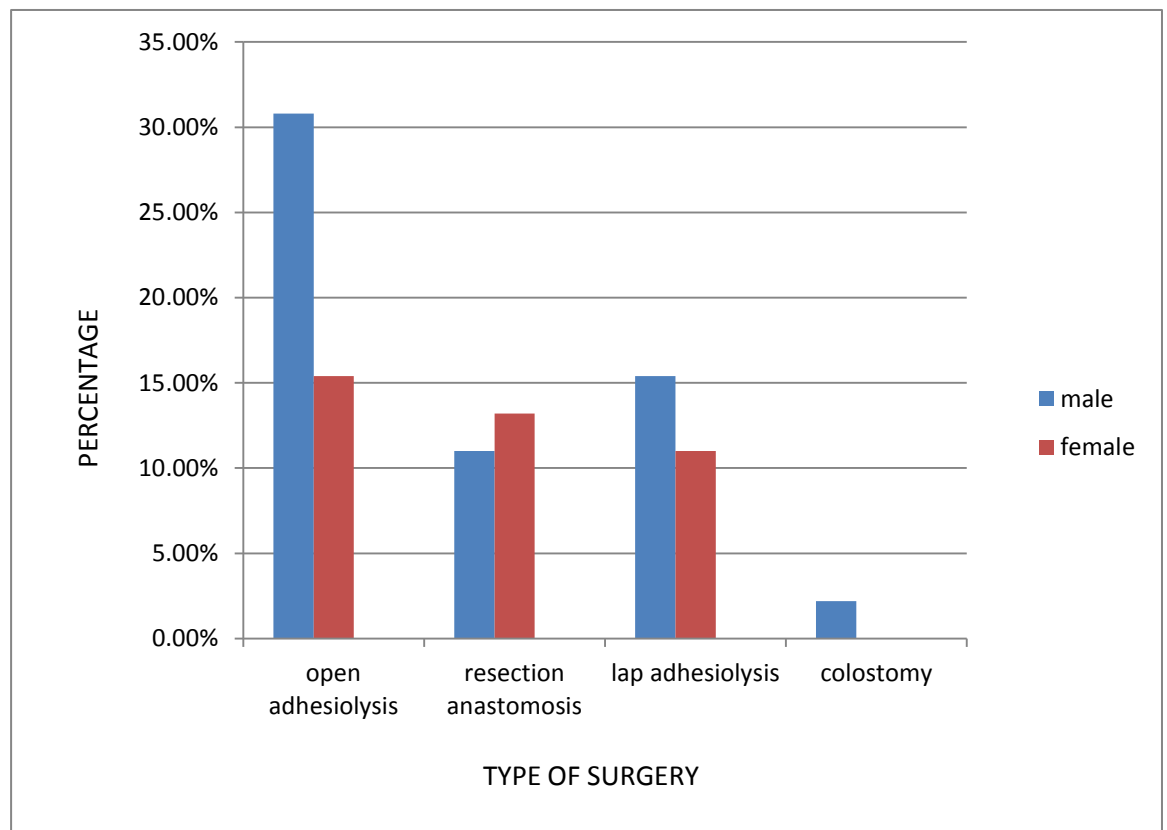


In the present study showed 24.3% of the patients with acute adhesive intestinal obstruction were females and 35.3% of the patients were males. 15.4% of the patients with sub acute adhesive obstruction were females and 24.3% of the patients were males. In both subacute and acute obstructions males are more commonly affected.



Among the 45 cases of adhesive intestinal obstruction 57.6% had undergone emergency surgery of which 24.3% were females and 33.3% were males. Since most of the patients were presented as acute obstruction the number of emergency surgeries found to have increased.

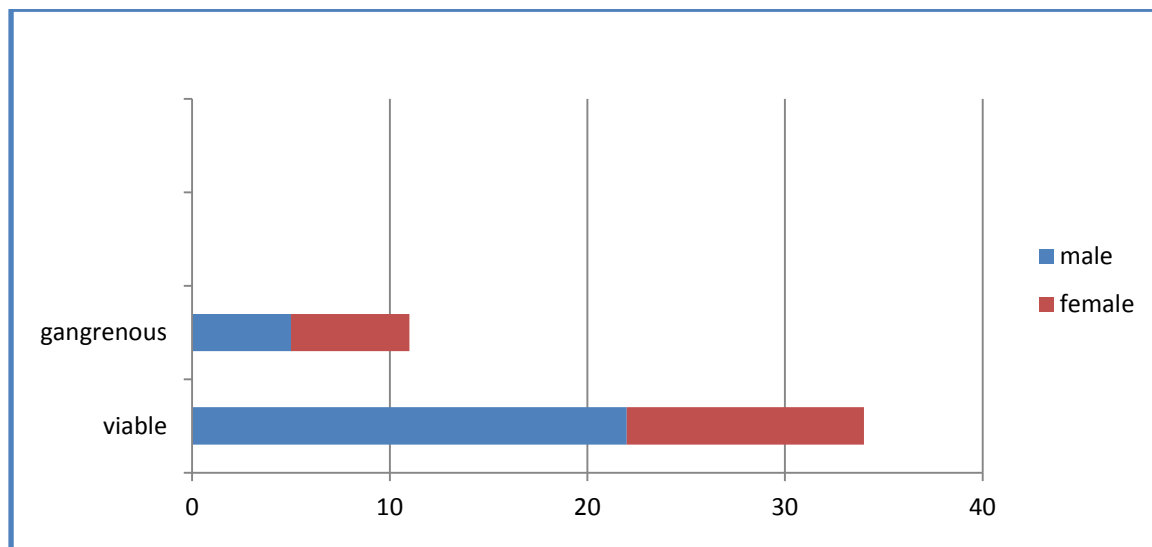
41.8% of the total patients had undergone elective surgery of which females constitutes 15.4% and males constitutes 26.4%.



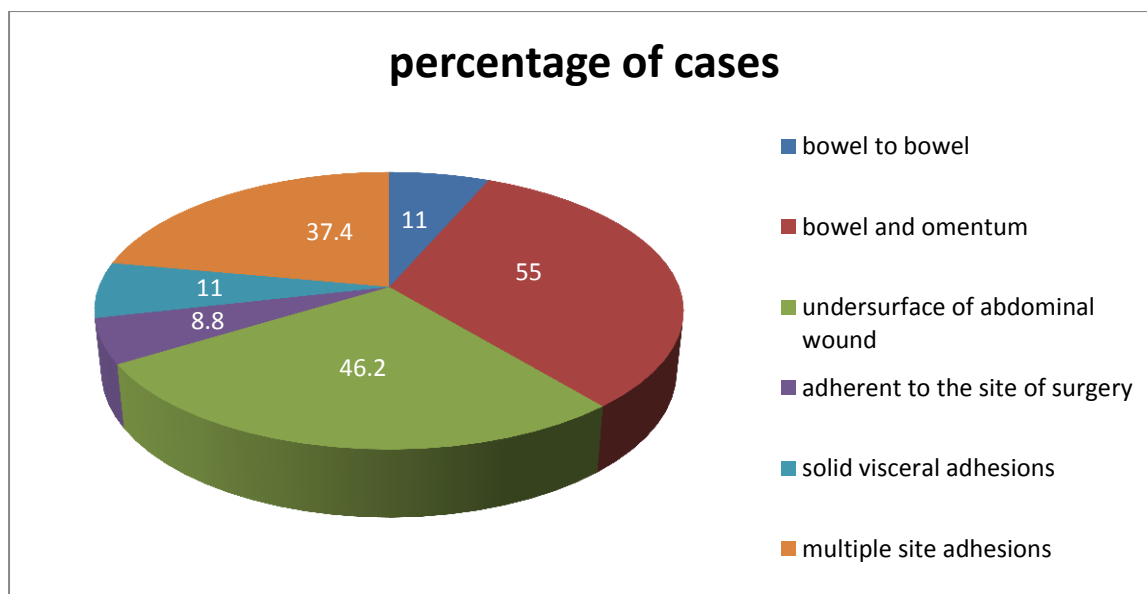
In this study, 46.2% of the patients were treated with open adhesiolysis of which males were 30.8% and females were 15.4%. laparoscopic adhesiolysis was done in 26.4% of cases out of which 11% were females and 15.4% were males. Transverse colostomy was done in 1 male patient. Resection anastomosis was done in 11 patients who had gangrenous bowel and this constitutes 24.2% of all cases.

Out of 45 cases 22 male and 12 female patients had viable bowel. This constitutes 74.8% of the total number of cases. 5 male and 6 female patients had gangrenous bowel which accounts for 24.2% of the total cases. Majority of the patients had viable bowel at the time of surgery

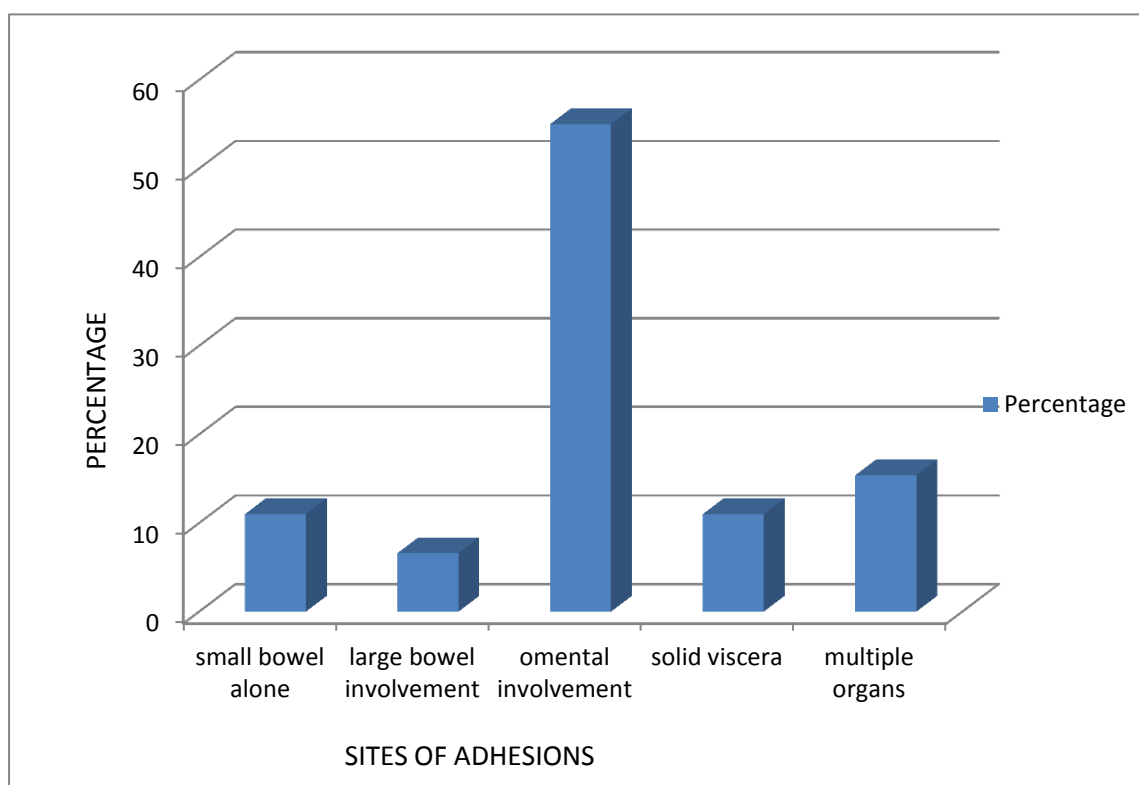
Only 11 patients had gangrenous bowel. Majority of the patients with gangrenous bowel had emergency surgery. Most of the patients with viable bowel had elective surgery. Most of the male patients had viable bowel at the time of surgery. Most of the female patients had gangrenous bowel at the time of surgery.



In our study omentum is the most common site of bowel adhesion accounting for 55 % of all adhesion sites. In a study conducted by Ketan R Vagholkar, J.adhesion % 20/birthoford, 2001, omentum was the most common cause of adhesion accounting for 57% of all adhesion sites. Both these results were comparable



In our study bowel to bowel adhesion is found to be the least common site of adhesion. Bowel adherent to the undersurface of the abdominal wound in 21 cases. Bowel and solid visceral adhesions seen in 5 cases and multiple site adhesions was found in 17 cases



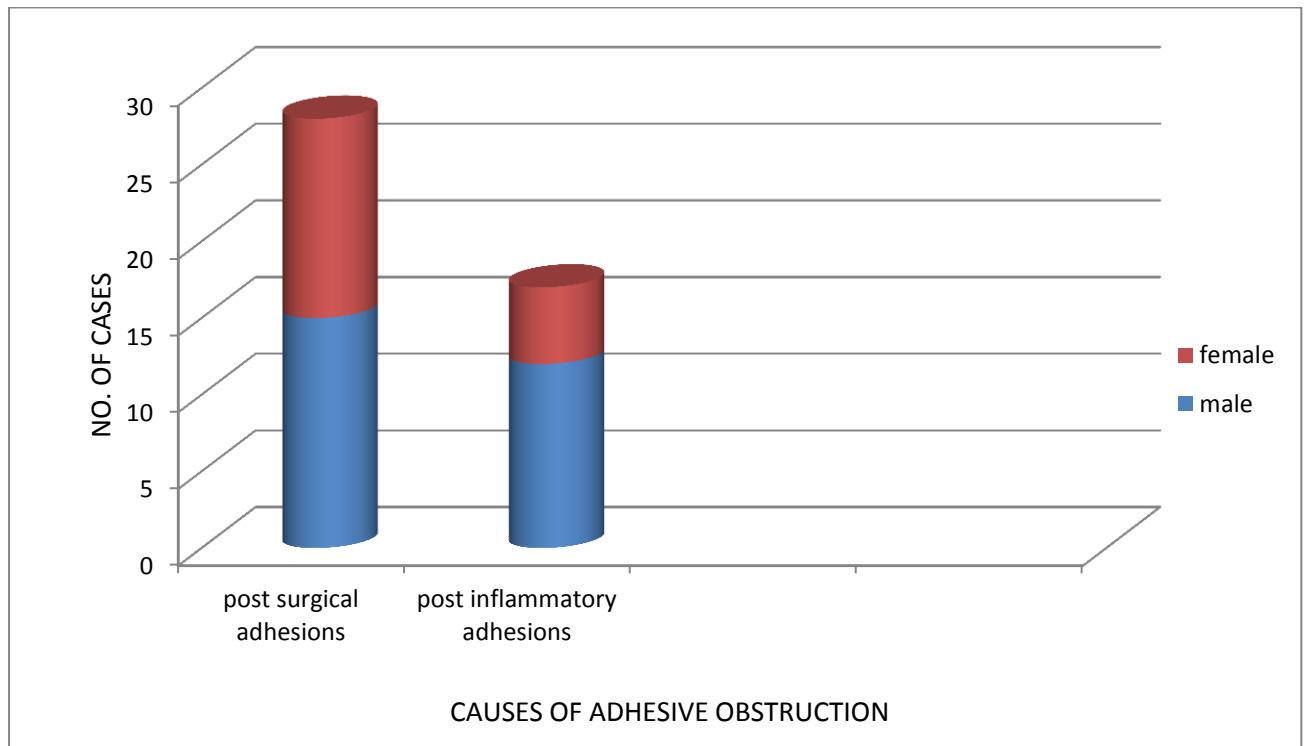
In this study bowel to bowel adhesions were found in 5 cases accounting 11 % of the total cases. Bowel was adherent to omentum in 25 cases accounting for 55% of the total cases. 21 patients had bowel adhesions in the undersurface of the abdominal wound. In 8.8% of the patients the adhesions were found between the bowel and the previous site of surgery. 5 patients had adhesions between the bowel and the viscera. In a study conducted by Ketan R Vagholkar, ADHESION % 20-journals/birthoford 3, 2011, small bowel alone is involved in 8% of cases. Omentum was involved in 57% of cases. Adhesions of small bowel to the wound occurred in 18% and small bowel to the site of surgery occurred in 16% of cases. These results were comparable.

Visceral adhesions seen in 5 cases constituting 11% of all cases. Multiple site adhesions seen in 7 cases constituting 15.4% of all cases.

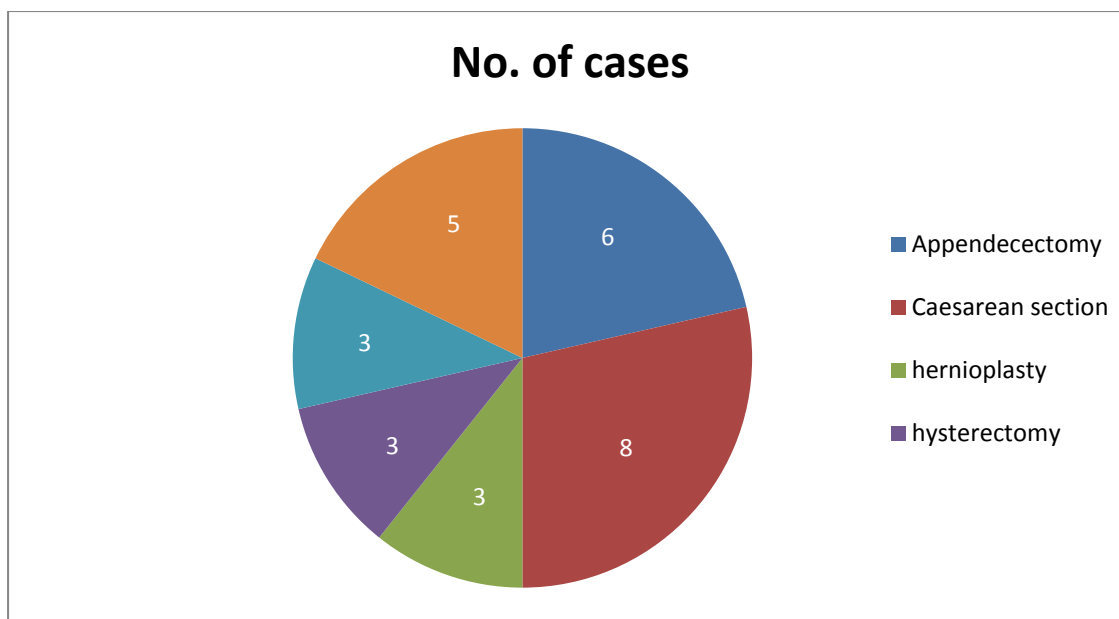
Post surgical and post inflammatory adhesions were the two common causes of adhesive intestinal obstruction in our study. 15 male and 13 female patients had adhesive intestinal obstruction due to post surgical adhesions. 12 male and 5 female patients had adhesive intestinal obstruction due to post inflammatory adhesions.

61.9% of the total cases were found to have intestinal obstruction due to previous surgery. 37.4% of the intestinal obstruction were due to post inflammatory adhesions.

In our study post surgical adhesions was found to be the most common cause of adhesive intestinal obstruction representing 61.9% of all cases. Post inflammatory adhesions were found in 37.4% of the total cases.

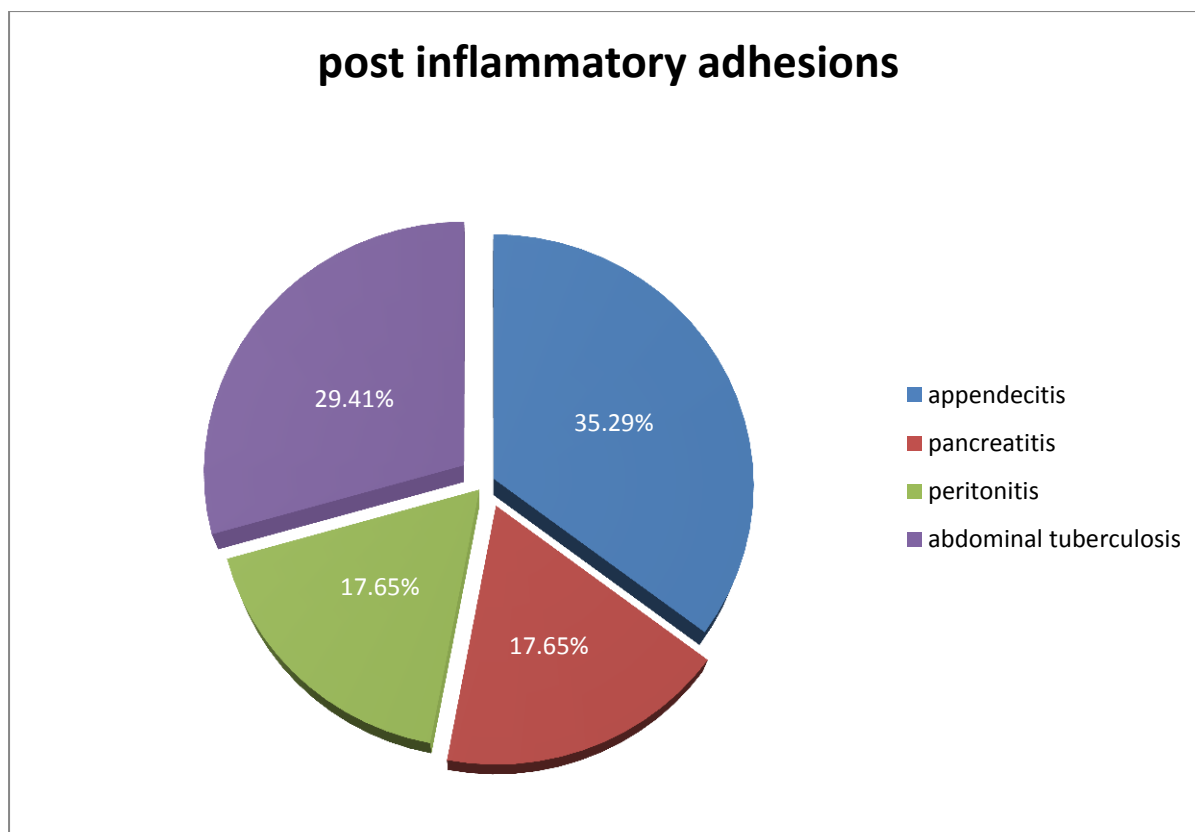


Appendicectomy,Caesarean Section,Perforation closure,Incisional hernia repair,Hysterectomy were the common causes found to cause post inflammatory adhesions in our study.Out of 28 cases of post inflammatory adhesions 28.57% of the patients had adhesions due to previous caesarean section.



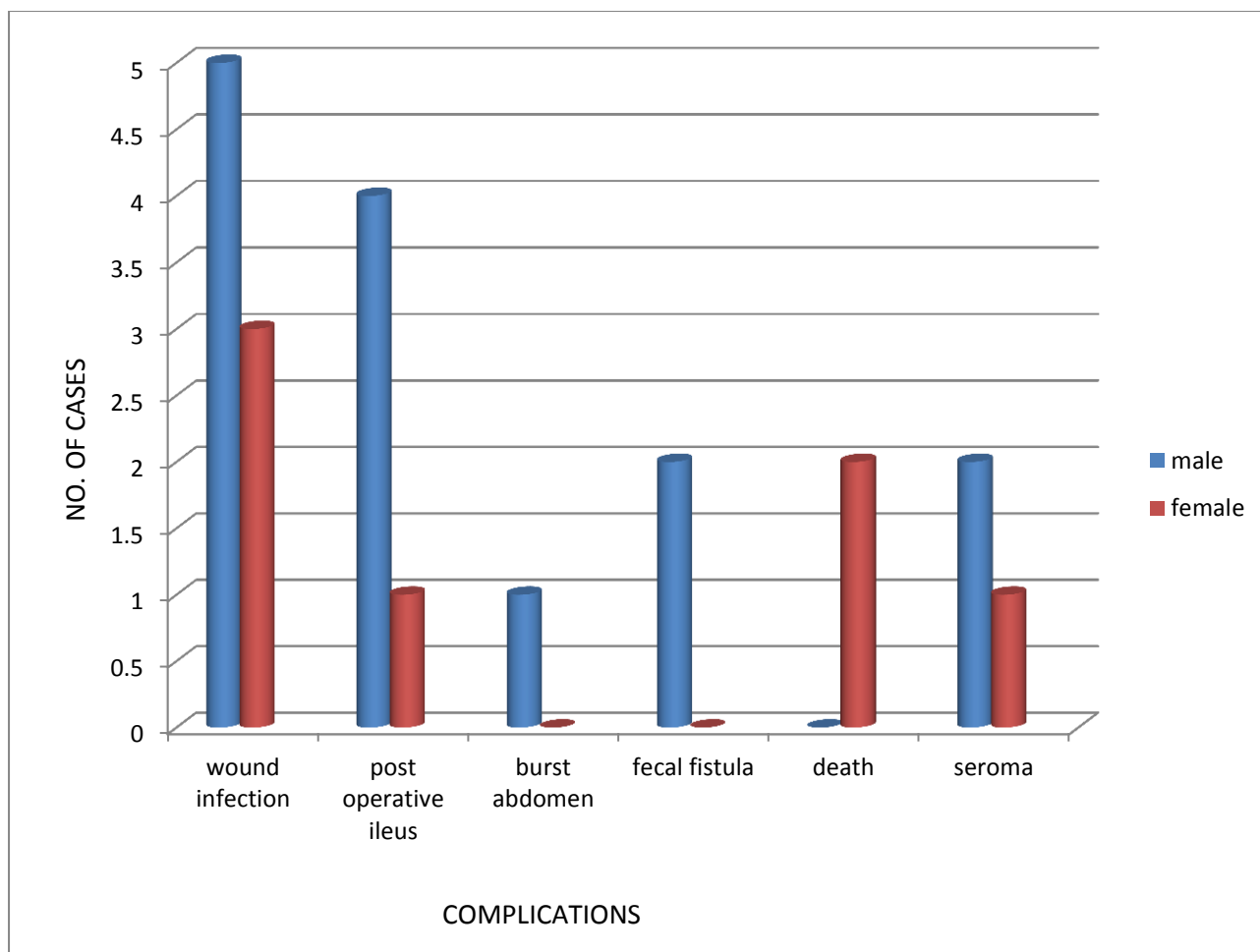
21.42% of the post surgical adhesions are due to previous appendectomy. Perforation closure accounted for 17.85% of the post surgical adhesions. Hernioplasty, Hysterectomy and other surgeries caused adhesions in rest of the patients.

Appendicitis, Peritonitis, Pancreatitis, Abdominal Tuberculosis were found to be the causes of post inflammatory adhesive intestinal obstruction in our study. 6 patients had post inflammatory adhesions due to appendicitis. 5 cases had post inflammatory adhesions due to abdominal tuberculosis. 3 patients had adhesions due to peritonitis and pancreatitis each respectively.



Appendicitis was found to be the most common cause post inflammatory adhesive intestinal obstruction accounting for 35.29% of the total post inflammatory adhesions. Peritonitis caused post inflammatory adhesions in 17.65% of cases. Abdominal tuberculosis was found to be the cause of adhesive intestinal obstruction in 29.41% of the cases. Pancreatitis caused adhesive obstruction in 17.65% of the cases.

As a whole, appendicitis was the most common cause post inflammatory adhesions in our study.



In the study group of 45 cases complications occurred in 21 cases. Wound infection was found to be the most common complication encountered in 8 cases representing 17.6% of all cases. In the wound infection group 5 cases were male and 3 cases were female.

2 patients died in the immediate post operative period and both of them were females above the age of 65 years.

Post operative ileus was found in 4 male and 1 female patients representing 8.8 and 2.2 % of the total patients respectively. Faecal fistula developed in 2 male patients. 3 patients had seroma in the post operative

period. Burst abdomen was encountered in 1 male patient which was later treated by secondary suturing.

46.2% of the total patients had complications in the post operative period. Among them, wound infection was found to be the leading complication and burst abdomen was the least common complication in our study.

SUMMARY

Adhesions are the leading cause of intestinal obstruction. Surgeons are frequently facing the emergency of acute intestinal obstruction in most of their duty days. Hence this study was focused on adhesive intestinal obstruction.

A collection of 45 cases of adhesive intestinal obstruction was done for this study from all the 6 surgical units in the period between September 2011 and November 2012.

Adhesive intestinal obstruction accounted for 29.2% of total intestinal obstructions in Coimbatore Medical College Hospital.

The incidence in sex is more in men than in women. Majority of the adhesive intestinal obstruction patients were in the age group of 41-70 years of age. In this study the male:female ratio is 1.5:1.

Majority of the patients presented as acute intestinal obstruction are males. Acute adhesive intestinal obstruction representing 59.6% of the total adhesive obstructions.

Most of the patients had undergone emergency surgery than elective surgery, representing 57.6 % and 41.8% respectively.

Laparotomy with adhesiolysis, laparotomy with resection and anastomosis, Laparoscopic surgeries and defunctioning colostomy are the surgical procedures done in our hospital for adhesive intestinal obstruction.³³

patients were treated with open surgeries and 12 patients were treated with laparoscopic surgeries.

In this study out of 45 cases, 34 patients were found to have viable bowel (74.8%) and 11 patients (24.2%) were found to have gangrenous bowel at the time of surgery.

Omentum was found to be the most common site of adhesions and it constituted 55% of all sites of adhesions.

Post surgical adhesive intestinal obstruction was more common than post inflammatory adhesive intestinal obstruction, representing 61.9% and 37.4% respectively. In this study caesarean section was found to be the most common cause for adhesive obstruction which constituted 28.57% of all cases of post surgical adhesions. 2 patients died in the immediate post operative period due to concomitant medical illness which represented 4.4% of the total cases.

Adhesions due to tuberculous etiology was found in 5 cases which constituted for 29.41% of all cases of post inflammatory adhesions.

Wound Infection was found to be the common complication. Wound infection was encountered in 17.6% of the total cases.

CONCLUSION

Acute intestinal obstruction is a real emergency surgical case admitted in our wards. Adhesions are the leading cause of intestinal obstruction.

Majority of the adhesive intestinal obstructions were post surgical than post inflammatory. Ileocaecal tuberculosis is one of the important cause of post inflammatory adhesive intestinal obstruction.

In subacute pattern of obstruction if the symptoms are not relieved with conservative management, the patient should be taken up for surgery.

Gentle handling of tissues and avoiding unnecessary manipulation of the bowel will reduce the incidence of intestinal obstructions due to post operative adhesions.

Close monitoring of the abdominal girth, recording BP, pulse rate and temperature and early recognition and early surgery will prevent gangrene of bowel.

Wound infection being the most common complication in this study, proper post operative wound care will prevent wound infections. Mortality depends upon the age of the patient and co-morbid conditions

This study was conducted in Coimbatore Medical College Hospital and the results are similar and comparable to other studies.

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S.N O.	NAME	AGE	SEX	I.P.	INVESTIGATIONS				PRESENTATION	PREVIOUS SURGERY	PROCEDURE TYPE	TREATMENT	FINDINGS	CAUSE	ORGAN INVOLVED	CONDITION OF BOWEL	COMPLICATION
					BLOOD	XRAY ABDOMEN	USG	CT ABDOMEN									
1	USHARANI	35	F	8875	YES	YES	YES	YES	SUB ACUTE	NO	ELECTIVE	LAP ADHESIOLYSIS	MULTIPLE ADHESIONS	APPENDICITIS	OMENTUM ILEUM	VIABLE	NO
2	JOTHI MALAR	25	F	54573	YES	YES	NO	NO	ACUTE	APPENDICECTOMY	EMERGENCY	ADHESIOLYSIS RESECTION&ANASTOMOSIS	ILEAL GANGRENE ADHESIONS	POST SURGICAL ADHESIONS	OMENTUM ILEUM	GANGRENE	WOUND INFECTION
3	AJMATH BEGUM	47	F	53610	YES	YES	YES	YES	SUBACUTE	NO	ELECTIVE	OPEN ADHESIOLYSIS	MULTIPLE ADHESIONS	PANCREATITIS	LIVER ILEUM OMENTUM	VIABLE	NO
4	KARTHIK	23	M	53540	YES	YES	NO	NO	ACUTE	NO	EMERGENCY	LAPAROTOMY RESECTION ANASTOMOSIS	ILEAL PERFORATION, GANGRENE	PERITONITIS	SMALL BOWEL,OMENTUM	GANGRENE	WOUND INFECTION
5	RAMATHAL	70	F	65969	YES	YES	NO	NO	ACUTE	HYSTERECTOMY	EMERGENCY	ADHESIOLYSIS, RESECTION	DENSE ADHESIONS	POST SURGICAL ADHESIONS	OMENTUM	GANGRENE	NO
6	DEVENDRAN	75	M	7000	YES	YES	NO	NO	ACUTE	HERNIOPLASTY	EMERGENCY	OPEN ADHESIOLYSIS	ADHESIONS	POST SURGICAL ADHESIONS	SMALL INTESTINE OMENTUM	VIABLE	POST OPERATIVE ILEUS
7	RAKAMMAL	70	F	745	YES	YES	YES	YES	SUBACUTE	NO	ELECTIVE	LAP ADHESIOLYSIS LAP APPENDICECTOMY	INTRAPERITONEAL ADHESIONS	SUB ACUTE APPENDICITIS	OMENTUM ILEUM	VIABLE	NO
8	KUPPAMMAL	65	F	8747	YES	YES	NO	NO	ACUTE	RESECTION SIGMOID GROWTH	EMERGENCY	RESECTION ADHESIOLYSIS	ADHESIONS ILEAL GANGRENE	POST SURGICAL ADHESIONS	ILEUM OMENTUM	GANGRENE	DIED
9	KOORMAN	41	M	5338	YES	YES	NO	NO	ACUTE	PERFORATION CLOSURE	ELECTIVE	OPEN ADHESIOLYSIS RESECTION	ADHESIONS, BOWEL GANGRENE	POST SURGICAL ADHESIONS	ILEUM	GANGRENE	POST OPERATIVE ILEUS
10	SUNDARAM	48	M	10124	YES	YES	YES	YES	SUBACUTE	HERNIOPLASTY	ELECTIVE	LAP ADHESIOLYSIS	DENSE ADHESIONS	POST SURGICAL ADHESIONS	SMALL BOWEL,OMENTUM	VIABLE	NO
11	SELVARAJ	58	M	13616	YES	YES	NO	NO	ACUTE	PERFORATION CLOSURE	EMERGENCY	OPEN ADHESIOLYSIS	SMALL BOWEL ADHESIONS	POST SURGICAL ADHESIONS	SMALL BOWEL,OMENTUM	VIABLE	NO45
12	NAGARATHINAM	45	M	12004	YES	YES	NO	NO	ACUTE	APPENDICECTOMY	EMERGENCY	OPEN ADHESIOLYSIS	ADHESIONS	POST SURGICAL ADHESIONS	SMALL BOWEL,OMENTUM	VIABLE	POST OPERATIVE ILEUS
13	LAKSHMI	80	F	12415	YES	YES	NO	NO	ACUTE	CAESAREAN	EMERGENCY	RESECTION ADHESIOLYSIS	ILEAL GANGRENE,ADHESIONS	POST SURGICAL ADHESIONS	ILEUM OMENTUM	GANGRENE	PATIENT DIED
14	CHELLAMMAL	60	F	15939	YES	YES	YES	YES	SUBACUTE	LSCS HYSTERECTOMY	ELECTIVE	OPEN ADHESIOLYSIS	SMALL BOWEL ADHESIONS	POST SURGICAL ADHESIONS	SMALL BOWEL,OMENTUM	VIABLE	SEROMA

S.N O.	NAME	AGE	SEX	I.P.	INVESTIGATIONS				PRESENTATION	PREVIOUS SURGERY	PROCEDURE TYPE	TREATMENT	FINDINGS	CAUSE	ORGAN INVOLVED	CONDITION OF BOWEL	COMPLICATION
					BLOOD	XRAY ABDOMEN	USG	CT ABDOMEN									
15	MARAGATHAM ANI	45	F	15320	YES	YES	NO	NO	ACUTE	LSCS	EMERGENCY	OPEN ADHESIOLYSIS	MULTIPLE ADHESIONS	POST SURGICAL ADHESIONS	SMALL BOWEL,OMENTUM	VIABLE	NO
16	SEETHA	21	F	16828	YES	YES	NO	NO	ACUTE	APPENDICECTOMY	EMERGENCY	OPEN ADHESIOLYSIS	MULTIPLE ADHESIONS	POST SURGICAL ADHESIONS	SMALL BOWEL,OMENTUM	VIABLE	WOUND INFECTION
17	MURUGANATHAN	22	M	34566	YES	YES	NO	NO	ACUTE	APPENDICECTOMY	EMERGENCY	OPEN ADHESIOLYSIS	MULTIPLE ADHESIONS	POST SURGICAL ADHESIONS	LIVER,OMENTUM,INTESTINE	VIABLE	NO
18	RAYAMMAL	52	F	59070	YES	YES	NO	NO	ACUTE	LSCS	EMERGENCY	OPEN ADHESIOLYSIS	MULTIPLE ADHESIONS	POST SURGICAL ADHESIONS	SMALL BOWEL,OMENTUM	VIABLE	NO
19	SIVARAJ	20	M	32481	YES	YES	YES	YES	SUBACUTE	PERFORATION CLOSURE	ELECTIVE	LAP ADHESIOLYSIS CLOSURE PERFORATION	LARGE,SMALL BOWEL ADHESIONS	POST SURGICAL ADHESIONS	LARGE,SMALL BOWEL	VIABLE	BURST ABDO,F. FISTULA
20	KASI	70	M	27701	YES	YES	NO	NO	ACUTE	END COLOSTOMY	EMERGENCY	LAP ADHESIOLYSIS	MULTIPLE ADHESIONS	POST SURGICAL ADHESIONS	ILEUM OMENTUM	VIABLE	NO
21	KITTUSAMY	50	M	28330	YES	YES	YES	YES	SUBACUTE	NO	ELECTIVE	LAP ADHESIOLYSIS	MULTIPLE SMALLBOWEL ADHESIONS	TB ABDOMEN	ILEUM OMENTUM	VIABLE	NO
22	MURUGANANTHAM	34	M	28397	YES	YES	YES	YES	SUBACUTE	NO	ELECTIVE	LAP ADHESIOLYSIS	ILEAL PERFORATION, ADHESION	PERITONITIS	ILEUM OMENTUM	VIABLE	NO
23	AARICHAMY	55	M	30698	YES	YES	YES	YES	SUBACUTE	NO	ELECTIVE	LAP ADHESIOLYSIS	SMALL BOWEL ADHESIONS	PANCREATITIS	SMALL BOWEL	VIABLE	NO
24	RAJATHI	38	F	16828	YES	YES	YES	YES	SUBACUTE	NO	ELECTIVE	LAP ADHESIOLYSIS	MULTIPLE ADHESIONS	TB ABDOMEN	SMALL BOWEL,OMENTUM	VIABLE	NO
25	MUTHUVEERAN	45	M	95011	YES	YES	NO	NO	ACUTE	NO	EMERGENCY	OPEN ADHESIOLYSIS	SMALL BOWEL ADHESIONS	APPENDICITIS	LIVER,OMENTUM,SMALL BOWEL	VIABLE	WOUND INFECTION
26	GANESAN	48	M	8332	YES	YES	NO	NO	ACUTE	NO	EMERGENCY	OPEN ADHESIOLYSIS	SMALL BOWEL ADHESIONS	APPENDICITIS	SMALL BOWEL,OMENTUM	VIABLE	WOUND INFECTION
27	SRIRANGAMMAL	52	F	4375	YES	YES	NO	NO	ACUTE	LSCS	EMERGENCY	OPEN ADHESIOLYSIS	SMALL BOWEL ADHESIONS	POST SURGICAL ADHESIONS	SMALL BOWEL,OMENTUM	VIABLE	POST OPERATIVE ILEUS
28	LAKSHMI	69	F	67001	YES	YES	YES	YES	SUBACUTE	INC.HERNIA, HYSTERECTOMY	ELECTIVE	LAP ADHESIOLYSIS	MULTIPLE ADHESIONS	POST SURGICAL ADHESIONS	LIVER,OMENTUM,SMALL BOWEL	VIABLE	SEROMA

S. N O.	NAME	A GE	S E X	I.P.	INVESTIGATIONS				PRESENT ATION	PREVIOUS SURGERY	PROCEDURE TYPE	TREATMENT	FINDINGS	CAUSE	ORGAN INVOLVED	CONDITION OF BOWEL	COMPLCATION
					BLO OD	XRAY ABD OM EN	USG	CT ABD OM EN									
29	MANI	52	M	63202	YES	YES			ACUTE	PERFORATION CLOSURE	EMERGENCY	RESECTION ADHESIOLYSIS	GANGRENE TRANSVERSE COLON	POST SURGICAL ADHESIONS	LARGE BOWEL,OMENTUM	GANGRENE	WOUND INFECTION
30	CHELLADURAI	75	M	6498	YES	YES	YES	YES	SUBACUTE	HERNIOPLASTY	ELECTIVE	OPEN ADHESIOLYSIS	MULTIPLE ADHESIONS	POST SURGICAL ADHESIONS	SMALL,LARGE BOWEL	VIABLE	NO
31	SHARMA	41	M	5338	YES	YES	YES	YES	SUBACUTE	PERFORATION CLOSURE	ELECTIVE	OPEN ADHESIOLYSIS	MULTIPLE ADHESIONS	APPENDICITIS	SMALL BOWEL,OMENTUM	VIABLE	NO
32	KUMARESAN	18	M	7014	YES	YES	YES	YES	SUBACUTE	NO	ELECTIVE	OPEN ADHESIOLYSIS	MULTIPLE ADHESIONS	POST SURGICAL ADHESIONS	SMALL BOWEL	VIABLE	NO
33	KITTAN	44	M	16302	YES	YES	NO	NO	ACUTE	NO	EMERGENCY	RESECTION ADHESIOLYSIS	ILEAL GANGRENE,ADHESION	PERITONITIS	ILEUM OMENTUM	GANGRENE	POST OPERATIVE ILEUS
34	KRISHNAN	65	M	43571	YES	YES	NO	NO	ACUTE	NO	EMERGENCY	OPEN ADHESIOLYSIS RESECTION	ILEAL GANGRENE,ADHESION	HEMORRHAGIC PANC REATITIS	ILEUM OMENTUM	GANGRENE	WOUND INFECTION
35	KARTHIK	18	M	45054	YES	YES	NO	NO	ACUTE	NO	EMERGENCY	OPEN ADHESIOLYSIS	APPENDICULAR ABSCESS,ADHESIONS	APPENDICULAR ABSCESS	SMALL BOWEL,OMENTUM	VIABLE	NO
36	MAHESHWAR I	55	F	41578	YES	YES	NO	NO	ACUTE	LSCS,HYSTERECTOMY	EMERGENCY	OPEN ADHESIOLYSIS	ILEAL PERFORATION,ADHESIONS	POST SURGICAL ADHESIONS	SMALL BOWEL,OMENTUM	VIABLE	NO
37	SASIKUMAR	29	M	45695	YES	YES	NO	NO	ACUTE	APPENDICECTOMY	EMERGENCY	OPEN ADHESIOLYSIS	MULTIPLE ADHESIONS	POST SURGICAL ADHESIONS	SMALL BOWEL	VIABLE	NO
38	LAKSHMANAN	80	M	16483	YES	YES	NO	NO	ACUTE	PERFORATION CLOSURE	EMERGENCY	TRANSVERSE COLOSTOMY	DENSE ADHESIONS	POST SURGICAL ADHESIONS	OMENTUM INTESTINE	VIABLE	NO
39	MAHESH	22	M	12554	YES	YES	YES	YES	SUBACUTE	APPENDICECTOMY	ELECTIVE	OPEN ADHESIOLYSIS	MULTIPLE ADHESIONS	POST SURGICAL ADHESIONS	SMALL BOWEL,OMENTUM	VIABLE	NO
40	GURUSAMY	73	M	19572	YES	YES	YES	YES	SUBACUTE	NO	ELECTIVE	OPEN ADHESIOLYSIS	DENSE ADHESIONS	TB ABDOMEN	ILEUM OMENTUM	VIABLE	NO

[illegible]

COIMBATORE MEDICAL COLLEGE HOSPITAL

COIMBATORE-18

DEPARTMENT OF SURGERY

**STUDY OF ADHESIVE INTESTINAL OBSTRUCTION AND ITS
MANAGEMENT IN COIMBATORE MEDICAL COLLEGE HOSPITAL**

DR. P. MURUGADASAN. M.S., POST GRADUATE

ACADEMIC PERIOD: SEPTEMBER 2011-NOVEMBER 2012

PROFORMA

Name: _____ **Age:** _____ **Sex:** Male/Female

S.No: _____ **IP No:** _____ **occupation:** _____

Diagnosis: _____

Treatment: _____

COMPLAINTS: 1. Pain _____ Yes/No

1. Duration
2. Nature
3. Site

2. Associated symptoms

- | | |
|-------------------------|--------|
| 1. Vomiting | Yes/No |
| 2. Diarrhea | Yes/No |
| Constipation | Yes/No |
| 3. Malena | Yes/No |
| 4. Abdominal distension | Yes/No |
| 5. Fever | Yes/No |
| 6. Urinary symptoms | Yes/No |

PAST HISTORY: 1. HISTORY OF PREVIOUS SURGERY _____ Yes/No

1. Emergency/Elective

2. Incision
3. Time interval between previous surgery and presentation

- | | |
|------------------------------------|--------|
| 2. H/o previous similar episodes | Yes/No |
| 3. Known HT/DM/COPD/CAHD/EPILEPTIC | Yes/No |

CLINICAL FINDINGS:

- | | |
|---|--------|
| 1. Abdominal distension | Yes/No |
| 2. Bowel sounds | Yes/No |
| 3. Movement of abdomen with respiration | Yes/No |
| 4. Any palpable mass in the abdomen | Yes/No |
| 5. Free fluids | Yes/No |
| 6. Previous surgical scars | Yes/No |
| 7. Per rectal examination | Yes/No |
| 8. Other complaints | Yes/No |
| 9. General condition of the patient | |

RELEVANT INVESTIGATIONS:

- | | |
|----------------------------|--------|
| 1. X-ray abdomen erect | Yes/No |
| 2. Ultrasound abdomen scan | Yes/No |
| 3. CT Scan abdomen | Yes/No |

TREATMENT GIVEN:

- | | |
|--|--------|
| 1. Laparotomy and adhesiolysis | Yes/No |
| 2. Laparoscopic adhesiolysis | Yes/No |
| 3. Laprotomy and resection anastamosis | Yes/No |
| 4. Colostomy | Yes/No |

COMPLICATIONS

PATIENT CONSENT FORM

STUDY: STUDY OF ADHESIVE INTESTINAL OBSTRUCTION AND ITS MANAGEMENT IN COIMBATORE MEDICAL COLLEGE HOSPITAL

This study has been explained to me in my own language and I understood the following

1. What the study involves
2. That the refusal to participate will not affect my treatment in any way
3. That I may withdraw to take part in this study

Signature of the patient:

Full name of the patient:

Address:

Date:

Witness: (should be a person not connected with the study)

I have been present while the procedure to be performed has been explained to the patient and I have witnessed his/her consent to take part.

Signature of the witness:

Full name of the witness:

Address:

Date:

PARTS OF THE BOWEL

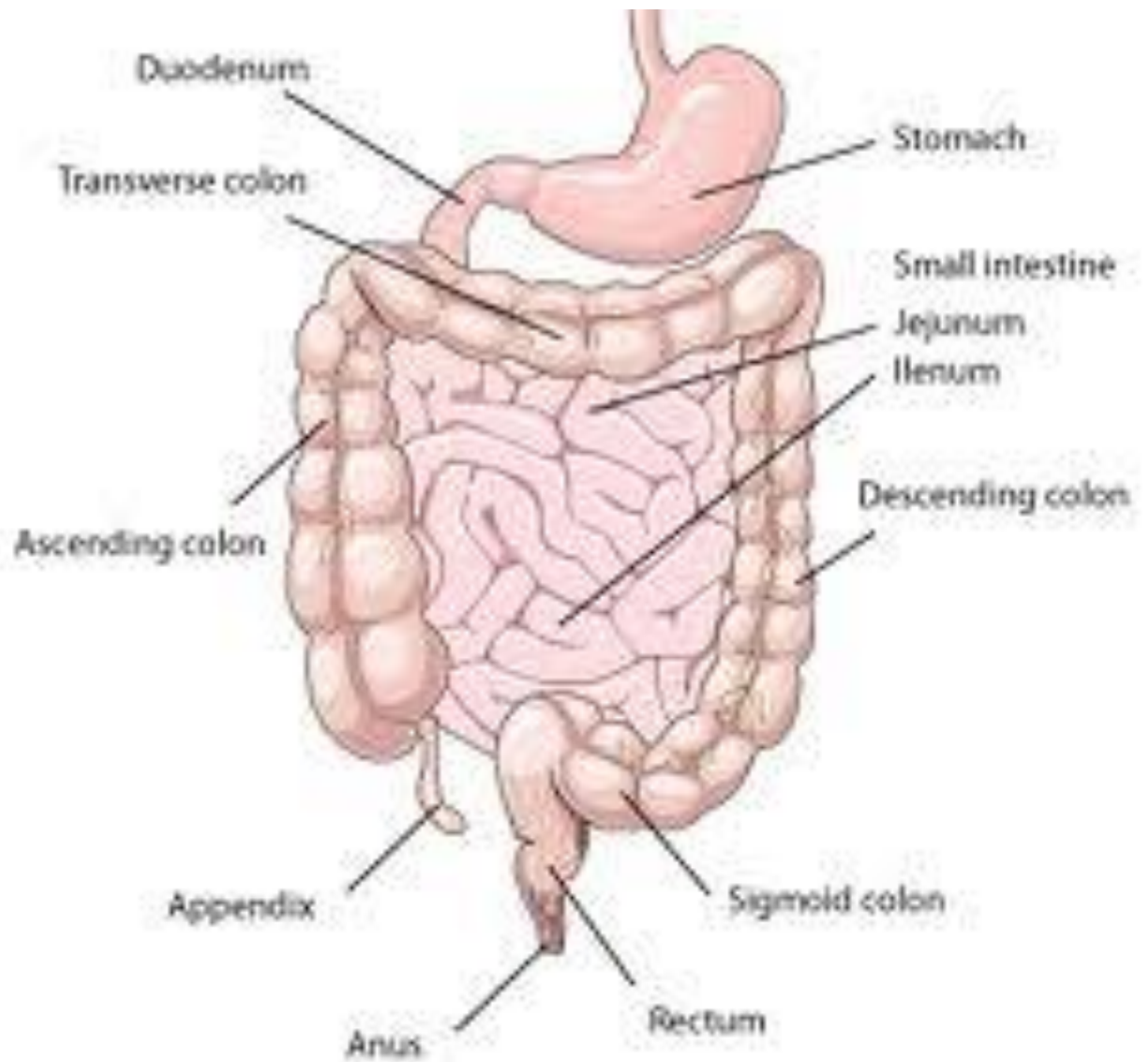


FIGURE 1

BLOOD SUPPLY OF SMALL AND LARGE BOWEL

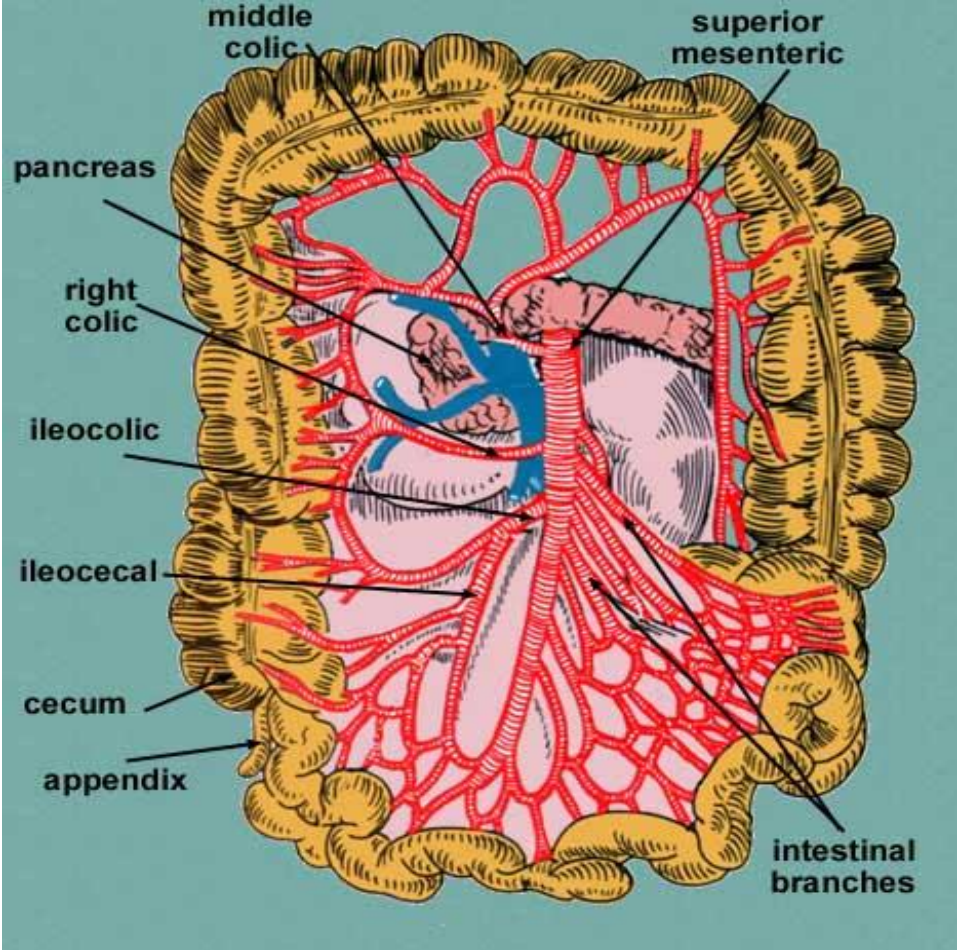


FIGURE 2

INFERIOR MESENTERIC ARTERY

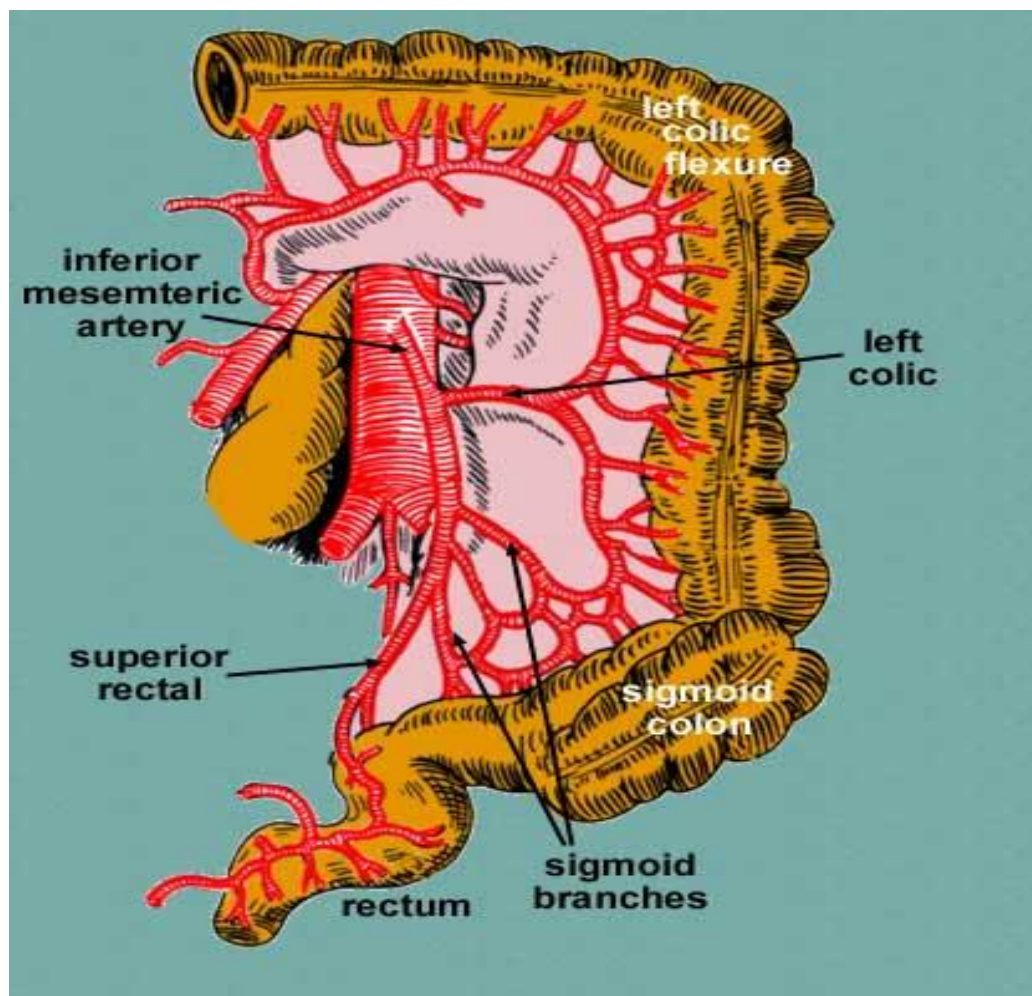


FIGURE 3

LAYERS OF SMALL INTESTINE

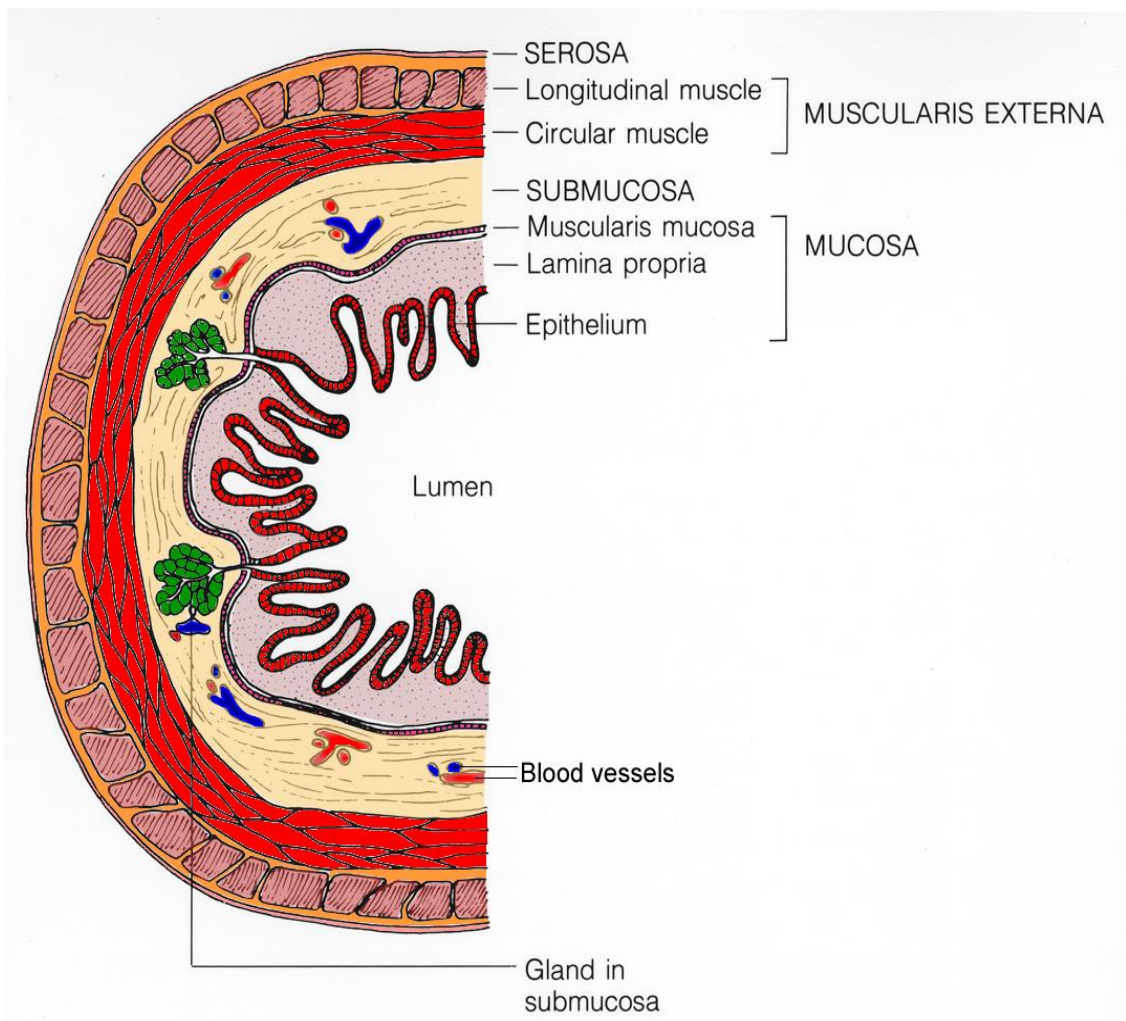


FIGURE 4

POST OPERATIVE PICTURE OF ADHESIOLYSIS



FIGURE 5

ADHESIONS WITHIN THE LOOPS OF ILEUM

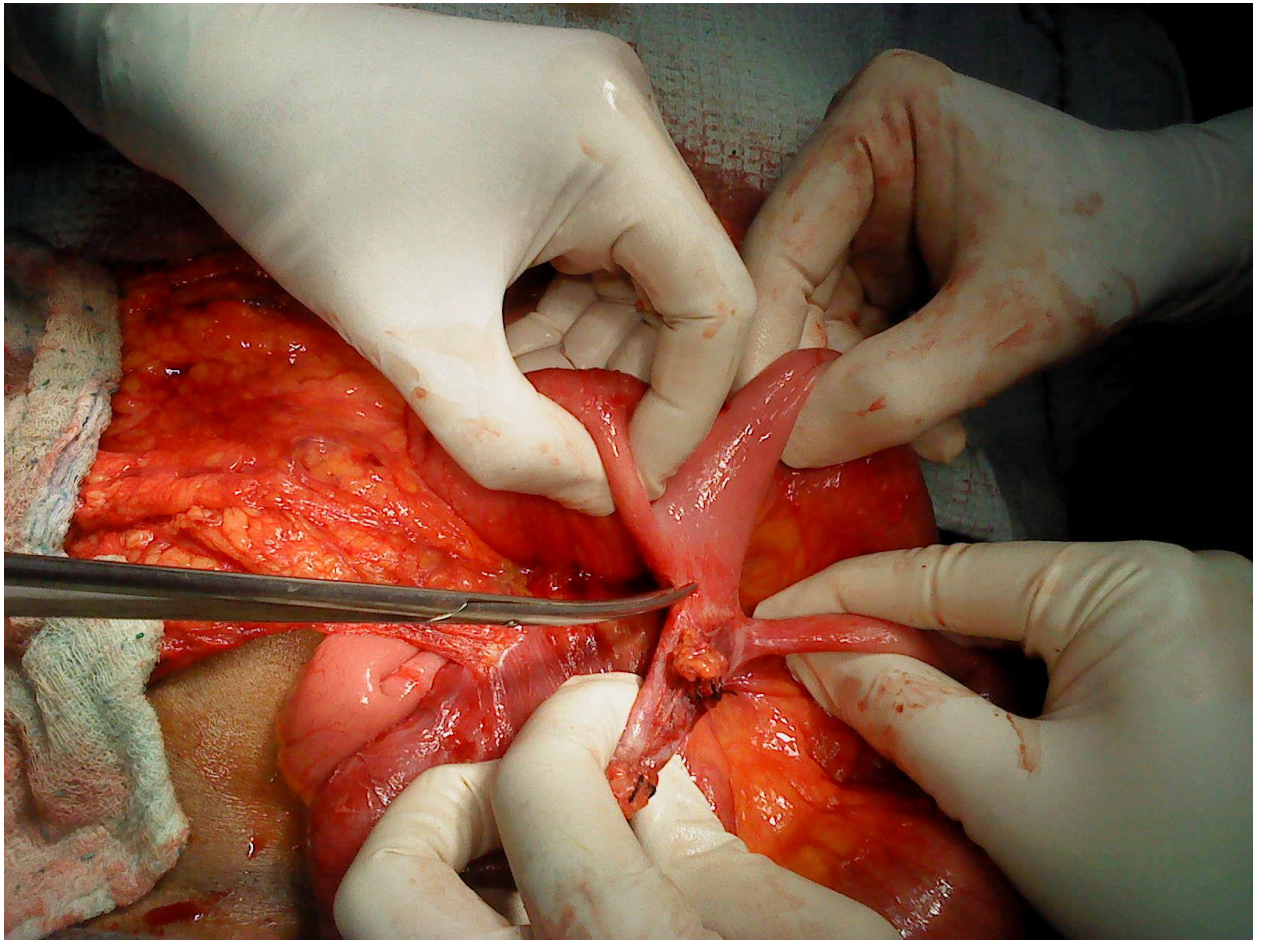


FIGURE 6

BOWEL TO BOWEL ADHESION

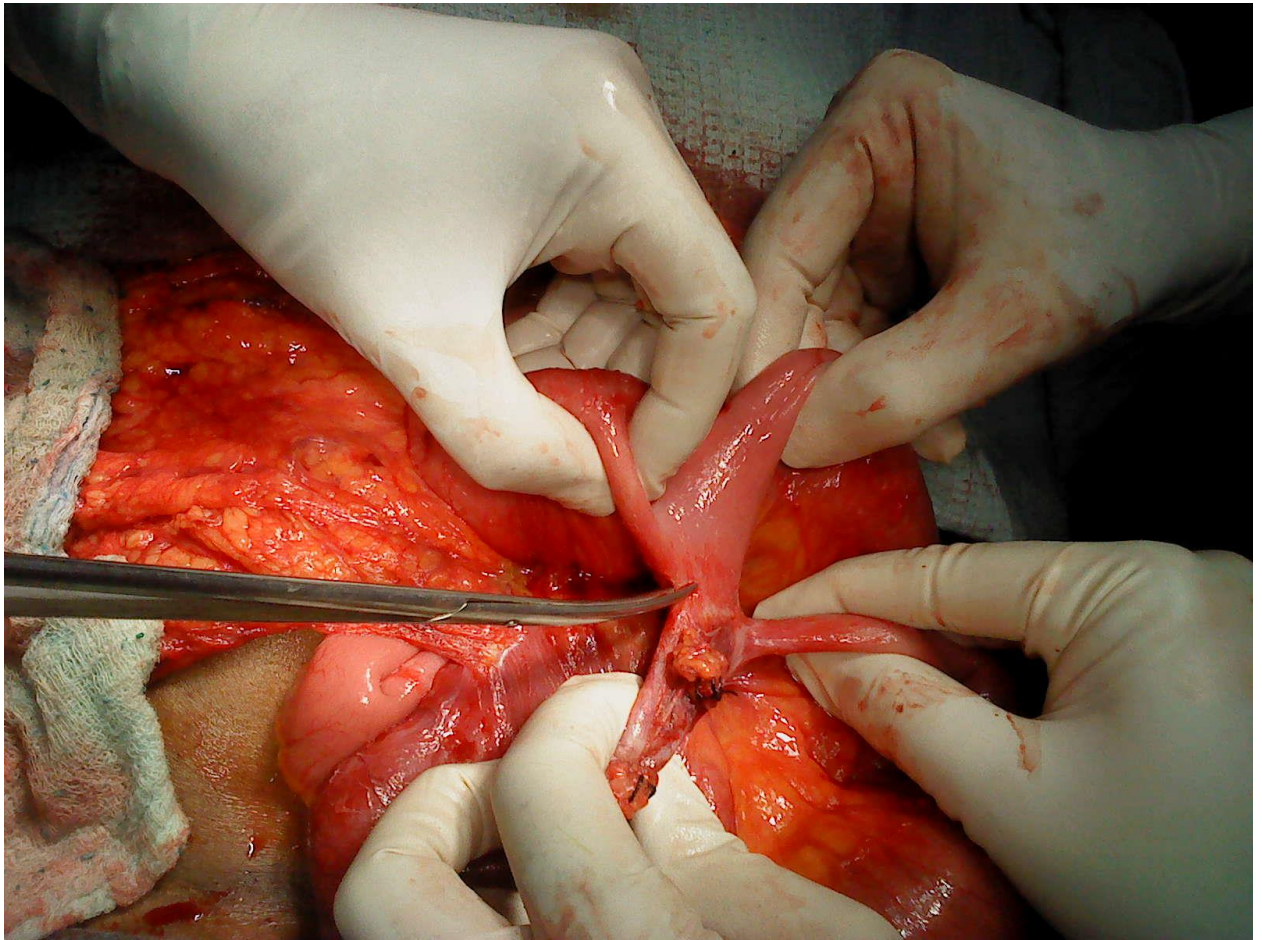


FIGURE 7

SMALL BOWEL ADHESION



FIGURE 8